

# Overview

Aesthetically, the Mac mini (Late 2014) model continues in the slimline aluminum housing design that was introduced with Mac mini (Mid 2010).

Mac mini (Late 2014) major changes:

- Opening the Mac mini (Late 2014) requires a suction cup, T6 security bit, and preset torque driver.
- Memory is integrated into the logic board and is no longer user-accessible.
- The server version is no longer offered.
- There is only one hard drive bay.
- Mac mini (Late 2014) does not feature a FireWire 800 port. Instead, the Mac mini (2014) has two Thunderbolt 2 ports.

Features of Mac mini (Late 2014) models include:

- New processors
- Onboard memory: 2GB, 4GB, or 8GB
- Four USB 3 ports
- Two Thunderbolt ports
- HDMI port
- SD card slot

## Product Configurations

To confirm the configuration, choose About This Mac from the Apple menu. The processor listing will show the speed of the processor followed by the processor type.

For product configurations, refer to Apple Support Tech Specs: [support.apple.com/specs](https://support.apple.com/specs).

## Service Procedure Differences

The main service differences from the previous Mac mini models are:

- The bottom cover can no longer be removed by the user.
- New logic boards have onboard memory (soldered to the board). Memory can be configured at the time of purchase.
- The battery is secured with battery tape (use kit 076-00016).
- The following screws require specific torque settings (refer to the individual procedure for the settings):
  - Antenna plate screws x 6 (923-00157 and 923-00158)
  - Fan to logic board screw x 1 (923-0252)
  - Logic board to housing screw x 1 (922-9959)

## Special Tools

- Suction cup (922-8252), to remove the bottom cover
- Torx T6 security bit (923-00304), to remove the antenna plate screws
- Torque driver, (923-0735), adjustable, 0.3 - 1.2 Nm (Newton meters)
- Torque driver, (923-00308), preset to 2.0 in-lbs
- Logic board removal tool (922-9588)





## Thunderbolt 2

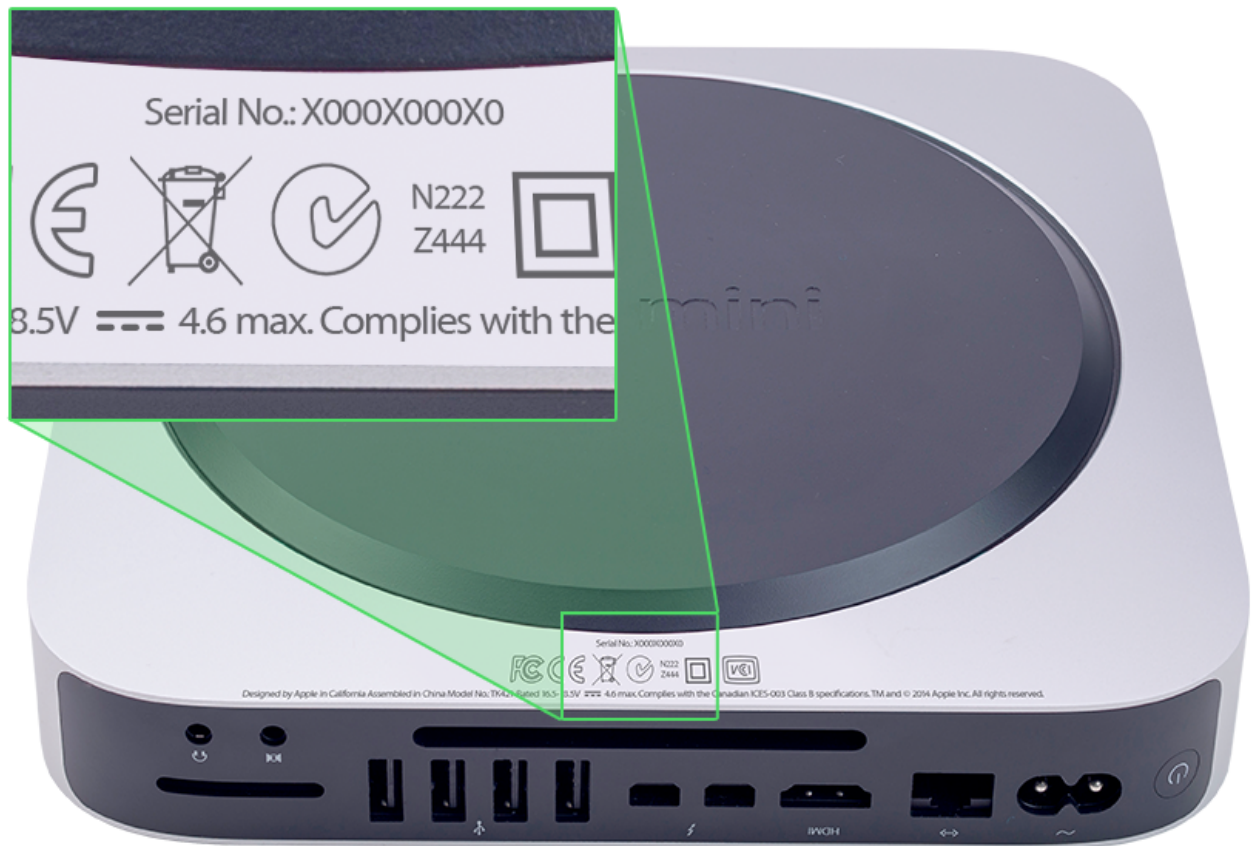
The Mac mini (Late 2014) model has two (2) Thunderbolt 2 ports that connect Thunderbolt-compatible high-resolution displays and high-performance data devices for high-speed data transfer. Thunderbolt 2 I/O technology sets new standards for speed, flexibility, and simplicity. Read more at [www.apple.com/thunderbolt](http://www.apple.com/thunderbolt).

**Important:** Thunderbolt 2 requires up-to-date software and firmware to function properly. Obtain the latest updates via Software Update.

**Caution:** The Thunderbolt 2 ports are keyed for cable insertion in only one direction. Be sure to insert cables with the correct orientation. Do not use excessive force if the cable does not fit.

## Serial Number Location

The Mac mini (Late 2014) serial number is located on the bottom of the housing.



# General Troubleshooting

## Update Software and Firmware

**Important:** Before you begin troubleshooting, ensure the correct version of macOS is installed, and check for and apply the latest software and firmware updates. Computers sometimes exhibit symptoms that indicate the wrong version of macOS system software is installed. Check article [HT204319: macOS versions and builds included with Mac computers](#) to make sure system build is correct for this computer model.

Firmware is the name given to software that is written into memory circuits such as flash memory, that will hold the software code indefinitely, even when power is removed from the hardware. Firmware on Intel Mac computers is designed to be updated if necessary by running the macOS Software Update check (available in the Apple () menu) while the computer is connected to the Internet.

For more information about firmware updates, refer to article [HT201518: About EFI and SMC firmware updates for Intel-based Mac computers](#).

## Troubleshooting Techniques

For more information, go to [ATLAS](#) and enter “troubleshooting” in the search field.

## Hardware vs. Software

To isolate a hardware issue from a software issue, refer to article [HT203161: Isolating issues in macOS](#).

To troubleshoot a software issue, refer to the following articles:

- [HT201516: How to troubleshoot a software issue](#)
- [HT201861: About incompatible software on your Mac](#)
- [HT204323: If a flashing question mark appears when you start your Mac](#)
- [HT204904: How to reinstall macOS](#)
- [HT202574: Mac mini \(Late 2012 and later\), iMac \(Late 2012 and later\): About Fusion Drive](#)

# Quick Check Procedures

## Resetting the System Management Controller (SMC)

The System Management Controller (SMC) is a chip on the logic board that controls all power functions. If the computer is experiencing any power issue, such as not starting up, not displaying video, sleep issues, or fan noise issues, resetting SMC may resolve it.

For more information and instructions to reset the SMC on different computer models, refer to article [HT201295: Reset the System Management Controller \(SMC\) on your Mac](#).

**Note for iMacs:** If the power button is pressed while inserting the power cord, the iMac will enter a mode in which the fans run at full speed. For more information, refer to article [HT204463: iMac: Fans run at full speed after computer turns on](#).

## Resetting Non-Volatile RAM (NVRAM)

NVRAM stores certain system and device settings in a location that macOS can access quickly. Exactly which settings are stored in the computer's NVRAM varies depending on the type of computer as well as the types of devices and drives connected. To reset NVRAM:

1. Shut down the computer.
2. Locate the following keys on the keyboard: Command, Option (Alt), P, and R. You will need to hold these keys down simultaneously in Step 4.
3. Press power button.
4. Immediately press and hold Command-Option-P-R keys.  
**Important:** You must press this key combination before the gray screen appears.
5. Hold down keys until computer restarts, and you hear startup chime a second time.  
**Note:** For MacBook Pro (Late 2016 and 2017) and MacBook (Retina, 12-inch, 2017), hold down keys for at least 20 seconds. There is no startup chime.
6. Release keys.

**Note:** After resetting NVRAM, you might need to reconfigure settings for speaker volume, screen resolution, startup disk selection, and time zone information.

For more information, refer to article [HT204063: How to Reset NVRAM on your Mac](#).

## Starting Up in Safe Mode

Safe Mode (sometimes called Safe Boot) is a way to start up a Mac so that it performs certain checks and prevents some software from automatically loading or opening. These changes can help resolve or isolate certain issues on the startup disk.

Follow these steps to start up into Safe Mode:

1. Be sure the computer is shut down.
2. Press the power button.
3. Press and hold the Shift key.  
**Note:** The Shift key should be pressed as soon as possible after the power button is pressed.
4. Release the Shift key when you see the Apple logo appear on the screen. After the Apple logo appears, it may take longer than usual to reach the login screen. This is because the computer is performing a directory check as part of Safe Mode.
5. To leave Safe Mode, restart the computer without pressing any keys during startup.

For more information, refer to article [HT201262: Use Safe Mode to isolate issues with your Mac](#).

# PRAM Reset and Measuring Coin Cell Battery Voltage

## PRAM Reset

A dead battery may prevent the computer from operating. Removing the coin battery for 1-2 minutes will fully reset the logic board PRAM. Refer to the Service Guide for the battery removal procedure.

## Measuring the Coin Cell Battery Voltage

1. Shut down and unplug the computer.
2. Remove the logic board. The coin battery is located on the bottom side of the logic board. **Note:** The battery provides power to the real-time clock (RTC) and parameter RAM (PRAM) when the computer is not connected to an AC power source.
3. Measure the coin battery voltage by using a voltmeter set for DC.
4. The battery can be measured two ways depending on whether it is installed in the computer. If you measure the battery while it is installed in the computer, touch the positive multimeter probe (red) to the positive side of the battery and the negative multimeter probe (black) to a metal grounding point on the logic board chassis. If you measure the battery after removing it from the computer, touch the positive multimeter probe to the positive side of the battery and the negative multimeter probe to the negative side of the battery (the opposite side of the coin battery) to read its voltage. If the voltage is 2.7v or less, replace the battery.
5. Reinstall the battery and reassemble the computer.
6. Turn on the computer.
7. If the computer starts up successfully, check for and apply the latest software and firmware updates.
8. The removal of the coin battery also resets the date and time. Use System Preferences > Date & Time to adjust back to the actual date and time settings.

# Diagnostic Software

Apple Authorized Service Providers use Apple Service Toolkit 2 for in-depth triage and troubleshooting of Mac mini (Late 2014).

## AST 2 Overview

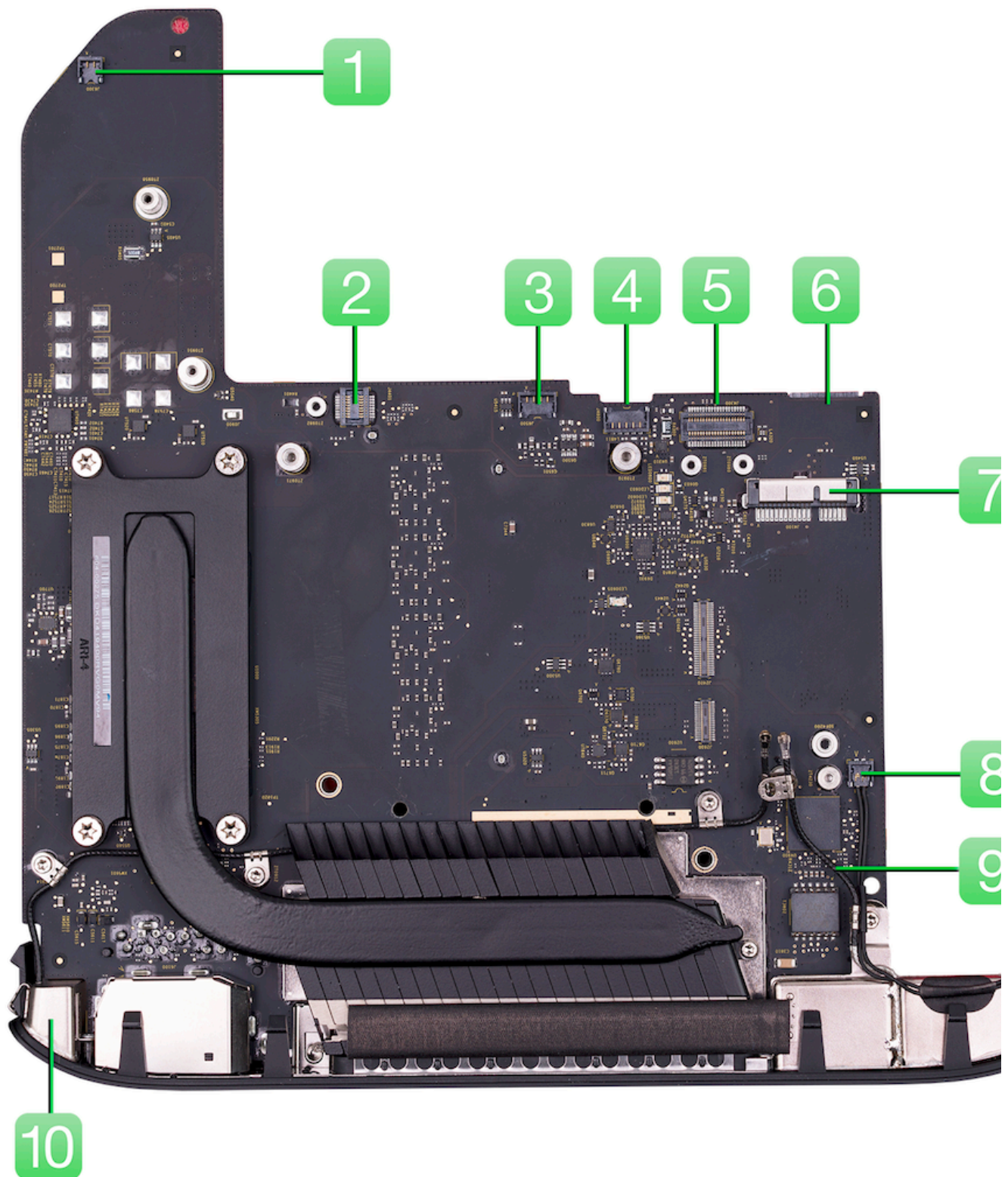
- Apple Service Toolkit 2 (AST 2) is a cloud-based diagnostic system to help technicians triage and verify repairs for Mac computers.
- AST 2 is accessed via GSX.
- AST 2 includes many of the same diagnostic suite tests that are available in AST.
- With AST 2, technicians can initiate diagnostics wirelessly on a customer's device and view diagnostic results using a Diagnostic Console (a web application on a Mac or iPad).
- To access the Diagnostic Console, log into GSX and click the Request Diagnostics button at the top of the screen.
- AST 2 diagnostic suites are delivered from the cloud to the device using the Diagnostic Console.
- In the original Apple Service Toolkit (AST), the diagnostics are delivered to the device (using the device itself) from the local Diagnostic Gateway server.
- In AST 2, the device under test communicates directly with the Diagnostic Console over the cloud. Every time you run a diagnostic, the latest version of the diagnostic tool is used.

Refer to [TP1103: AST 2 Reference Guide – Overview](#) for more information.

## Functional Overview

Refer to this diagram for symptoms related to the connectors on the front of the logic board.

### Mac mini (Late 2014) Logic Board



**1 = Internal speaker**

- no internal speaker sound
- distorted sound from internal speaker

**2 = Hard drive**

- no hard drive visible in System Information
- will not start up from internal drive

### **3 = Fan**

- not running or running fast
- system freezes
- intermittent shutdowns

### **4 = Infrared sensor (IR) + sleep LED**

- no IR reception
- no power ON (shorted cable)
- no sleep LED status

### **5 = Flash storage**

- no flash storage listed in System Information
- will not start up from flash storage

### **6 = Power supply**

- does not turn on
- intermittent shutdowns
- fan runs unusually fast (power supply thermal sensor not reading)

### **7 = Wireless card**

- cannot enable Bluetooth
- cannot enable Wi-Fi
- kernel panic (when loading wireless driver)

### **8 = Power switch connector**

- does not turn on when power switch is pressed

### **9 = Wi-Fi antenna**

- no Wi-Fi or poor Wi-Fi performance

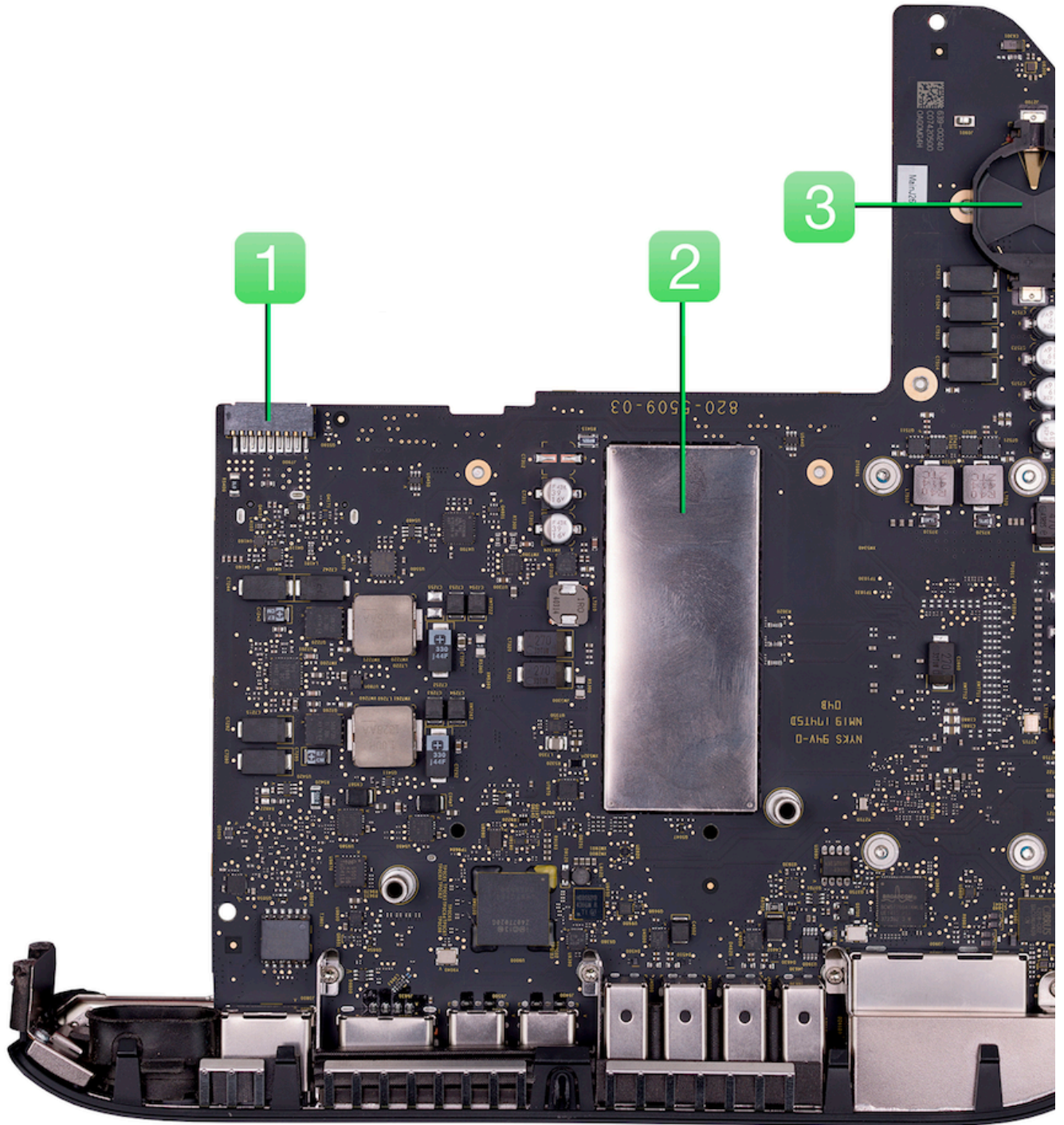
### **10 = Wi-Fi/Bluetooth shared antenna**

- no Wi-Fi or poor Wi-Fi performance
- unable to pair Bluetooth devices
- poor Bluetooth performance

Refer to this diagram for symptoms related to the connectors on the back of the logic board.

### **Mac mini (Late 2014) Logic Board**





**1 = Power supply**

- does not turn on
- intermittent shutdowns
- fan runs unusually fast (power supply thermal sensor not reading)

**2 = Memory (onboard memory, not removable)**

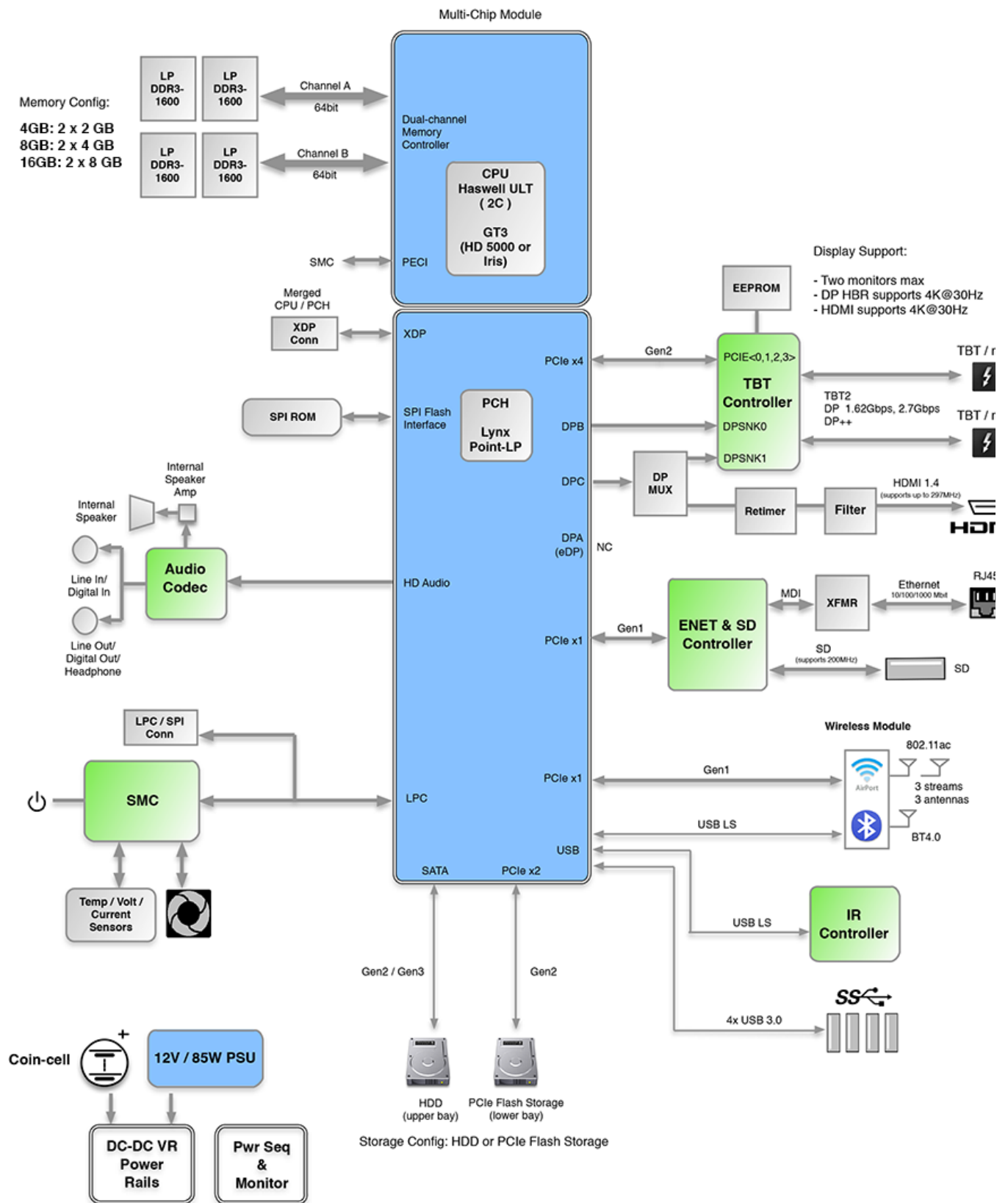
- will not start up
- system freeze or kernel panics
- video artifacts

**3 = Backup battery**

- incorrect date and time settings
- incorrect configuration settings
- no startup/video

# Block Diagram

Refer to this diagram to see how the Mac mini (Late 2014) modules are interrelated.



# Required Tools

The following tools are required to service the computer:

- ESD wrist strap and mat
- Torx T5 screwdriver
- Torque driver, adjustable, 0.3-1.2 Newton meters (Nm), (923-0735)
- Torque driver, preset, 2.0 in-lbs, (923-00308)
- Torx T6 security bit - special T6 security bit for antenna plate screws (923-00304)
- Torx T6 screwdriver
- Torx T8 screwdriver
- Phillips #0 screwdriver
- Logic board removal tool (922-9588)
- Suction cup (922-8252)
- Black stick (922-5065)
- ESD-safe tweezers
- Screw tray
- Isopropyl alcohol (IPA) wipes

**Note:** The logic board removal tool is required to dislodge the logic board assembly. Dislodging or removing the logic board assembly is required to access many parts (refer to Apple Support article [TP1154: First Remove Hierarchy](#)). Refer to Apple Support article [OP101: Hand Tools for Repairs](#) to purchase tools.

## Cosmetic Care

Cosmetic surfaces have a high exposure to potential damage or scratching. Be extremely careful not to damage the housing and other cosmetic surfaces with inadvertent tool movements. In general, avoid scratching interior or exterior surfaces. Use an IPA wipe to remove fingerprints or residual marks from the rubber suction cup.

# Connector Types on Logic Board

The Mac mini has small and delicate cable connectors and screws. Use extra care and finesse to avoid damaging components.

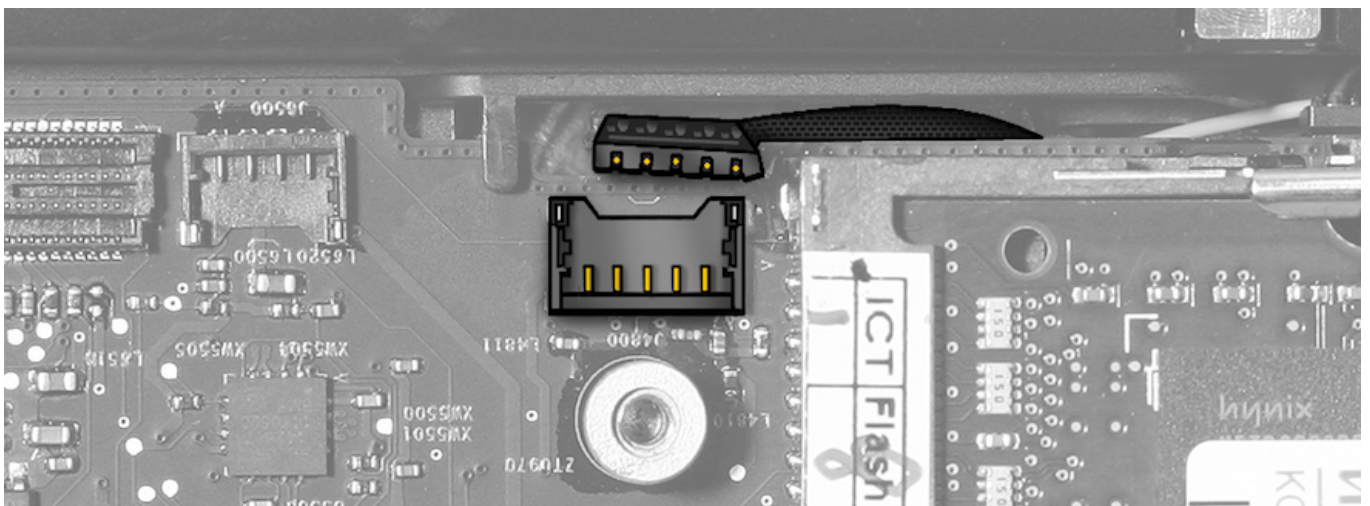
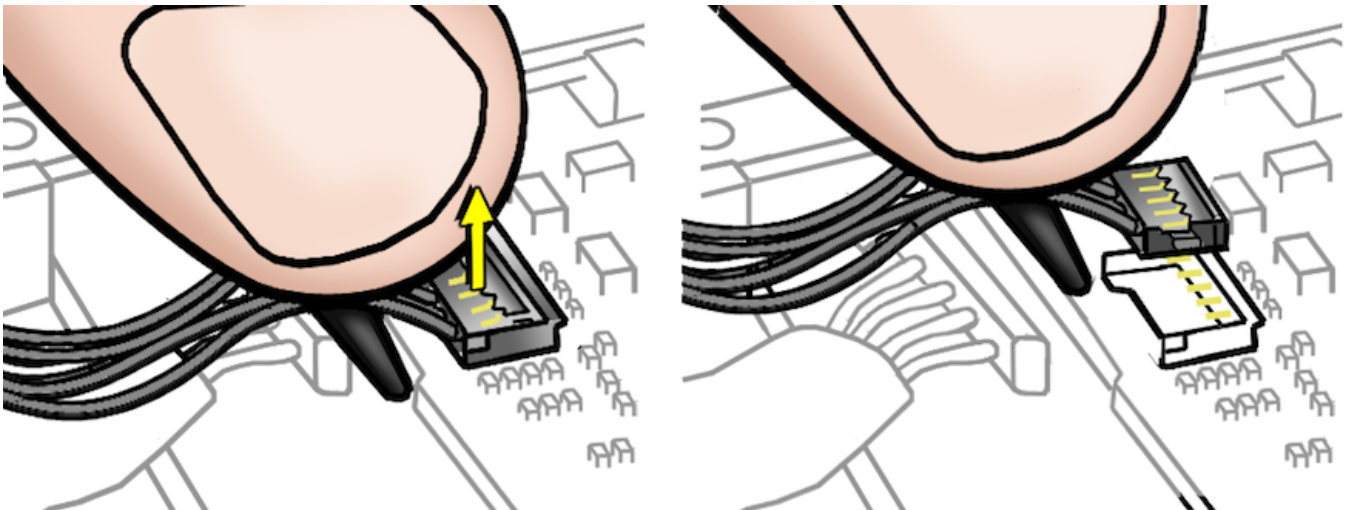
On the logic board are two types of connectors, each requiring special handling. Make sure you read these tips before disconnecting and installing the connectors.



## Vertical Insertion (JST)

- **Important:** These connectors are extremely fragile. Use extreme care. Major repairs may be needed if damaged.
- Use a black stick under the cable next to the connector, with a finger over the top for support, or grasp cables with tweezers and lift straight up to remove.
- Keep connector level with board when disconnecting and reconnecting.
- When connecting, verify that the grooves in the connector face down.
- Press evenly when reconnecting, or connector may be tipped up and not fully seated.

### [Vertical Insertion \(JST\) Video](#)

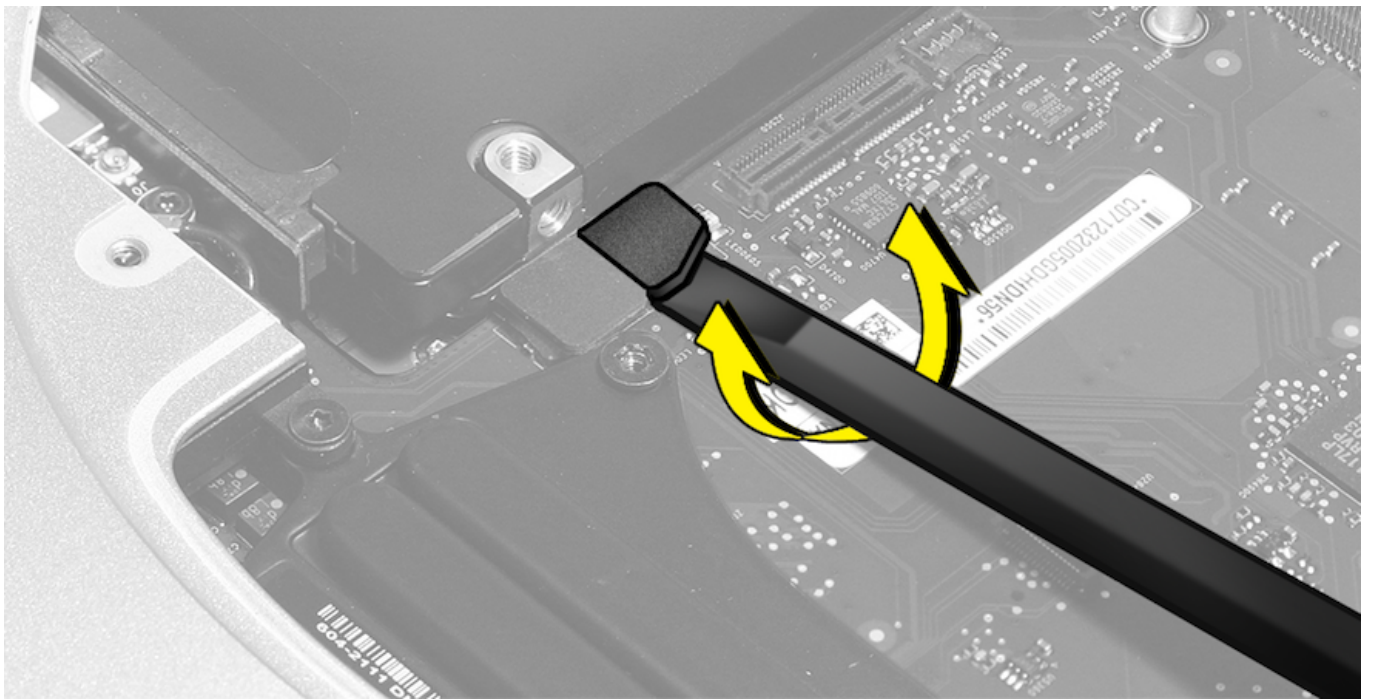


## Low-Profile Solid Platform Flex

- Use the flat end of a black stick to flip up the connector in one motion.
- To install, keep connector level with board and press down evenly.

### [Low-Profile Solid Platform Flex Video](#)

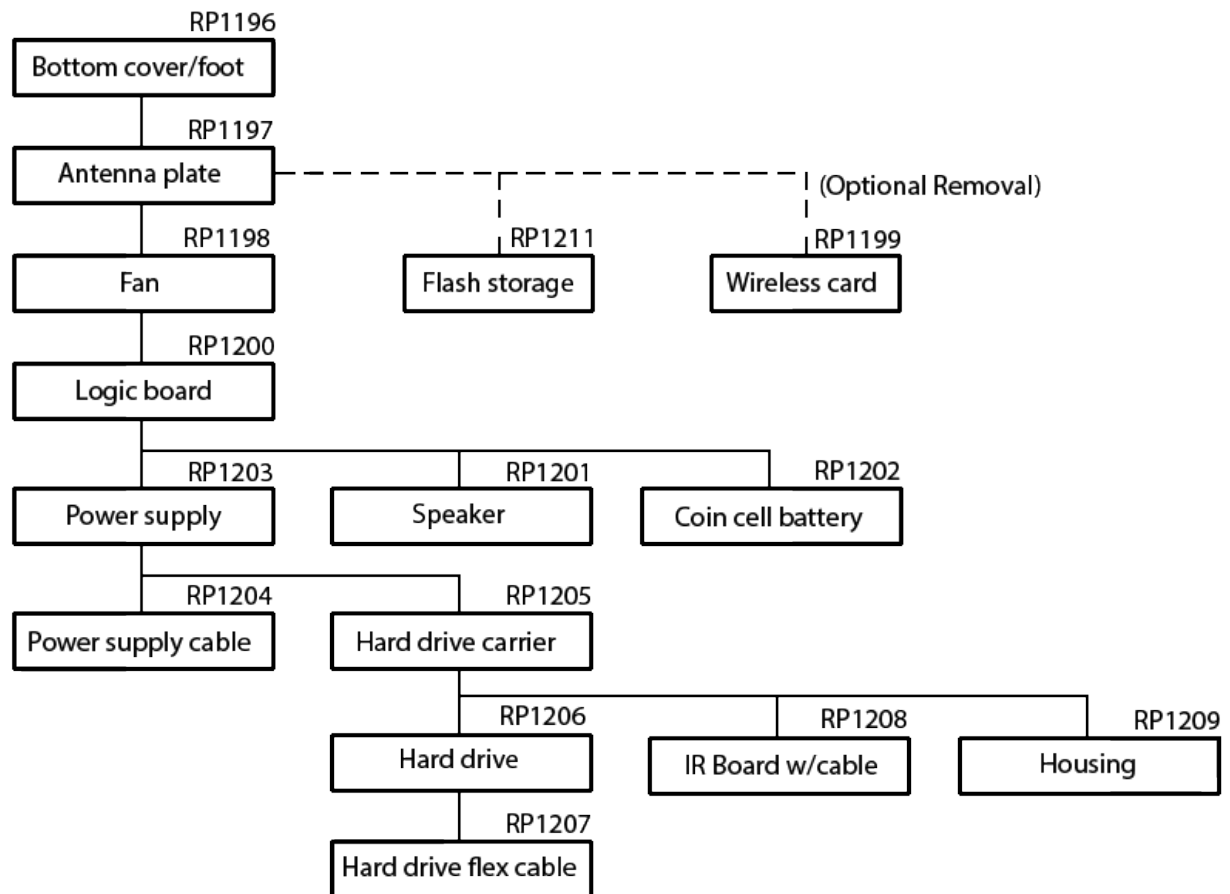




## First Remove Hierarchy

The following chart shows the parts that must be removed before a take-apart procedure can be performed.

- Parts on the same level can be removed independently of others on that level.
- A dotted line indicates that removal is optional. For example, you don't need to remove the flash storage or wireless card to access the fan or the logic board.



# Take Apart Procedure Notes

## Reassembly Steps

When no replacement steps are listed, replace parts in exact reverse order of Removal procedure.

## Note About Images in This Guide

In some cases a pre-production model may have been used to document the procedures in this guide. Although there may be small differences in appearance between the image pictured and the computer you are servicing, the procedures are the same unless noted.

## Screw Sizes

All screw sizes shown are approximate and represent the total length of the screw.



# Bottom Cover

## First Steps

- Shut down the computer.
- Disconnect all external cables.
- Place the computer on a clean, flat surface.
- Orient the computer with the I/O ports facing you.



## Tools

- Suction cup (922-8252)
- Isopropyl alcohol (IPA) wipe



## Steps For Removal

1. Clean the underside of the suction cup with an alcohol wipe to remove any residual dirt or dust before pressing the suction



cup onto the bottom cover.

2. Gently push the clean suction cup onto the center of the bottom cover.



3. Pull the suction cup straight up to remove the bottom cover.

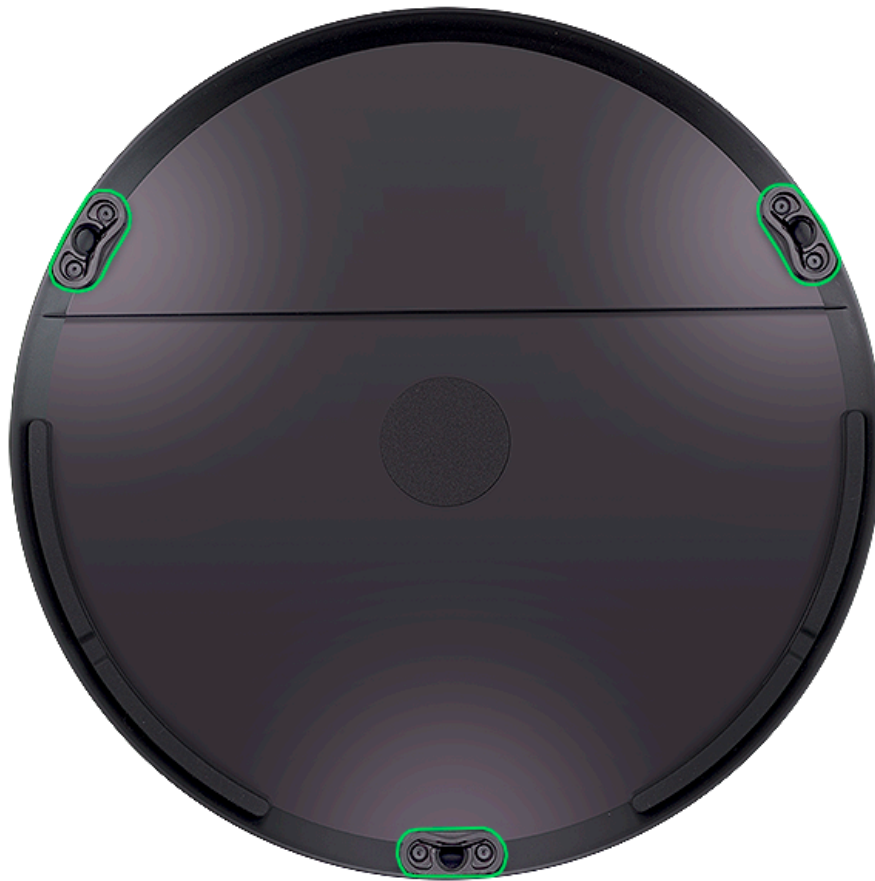


## Steps For Reassembly

1. With the Mac mini I/O ports facing you, align the molded screw cutouts on the bottom cover with the three larger antenna plate screws.



## Molded Screw Cutouts



2. Align the bottom cover with the screw near the I/O port first, then align with the other two screws. Once it is aligned, press down on the cover with your fingers until the bottom cover snaps onto the housing.





3. Use an IPA wipe to clean any residual marks or fingerprints from the bottom cover.





# Antenna Plate

## First Steps

Remove:

- [Bottom cover](#)



## Tools

- Black stick
- ESD-safe tweezers
- Torx T6 screwdriver
- Torx T6 security bit (923-00304) - security bit for antenna plate screws
- Torque driver, adjustable, 0.3-1.2 Newton meters (Nm), (923-0735) - use with T6 security bit to hand-tighten screws



## Steps For Removal

1. Use the adjustable torque driver with the T6 security bit to remove six (6) T6 antenna plate screws. **Note:** Check that the T6 security bit is set firmly into the screw head before attempting removal, to avoid damaging the screw head.

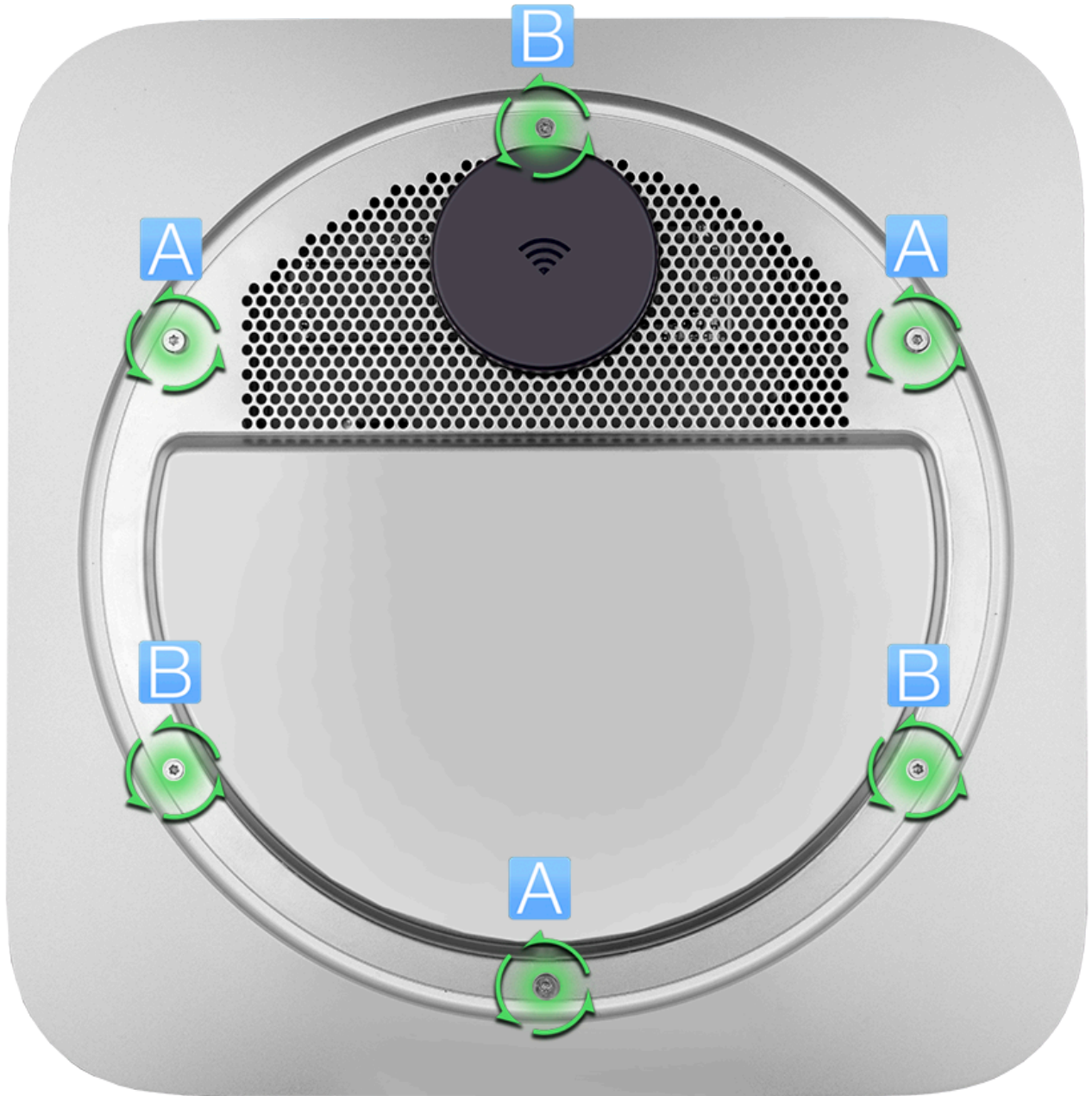
**Note:** Screw images do not represent their actual size.

- Three (3) larger shoulder screws (A) (923-00157)



- Three (3) smaller screws (B) (923-00155)



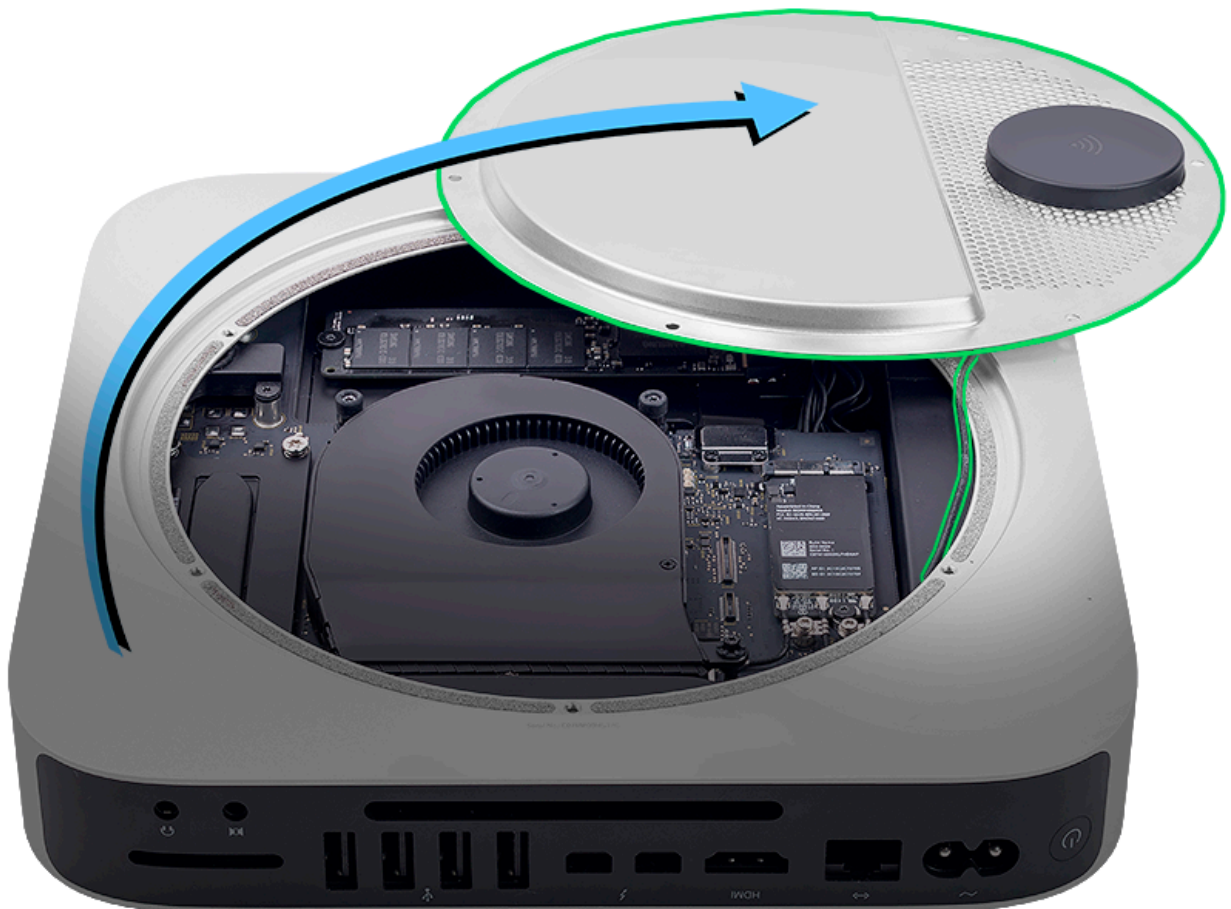


2. Use a black stick to carefully pry up the antenna plate about 0.25 inch (6.35 mm). **Caution:** The antenna plate antenna is still attached to the wireless card at this point. See the next step.





3. Gently rotate the antenna plate clockwise to access the antenna cable, which is connected to the wireless card.



4. Do the following:



- Use a Torx T6 screwdriver to remove one (1) antenna screw (#1) from the logic board standoff.
  - One (1) 923-00156



- Use tweezers or a black stick to disconnect the antenna cable (#2) from the wireless card.

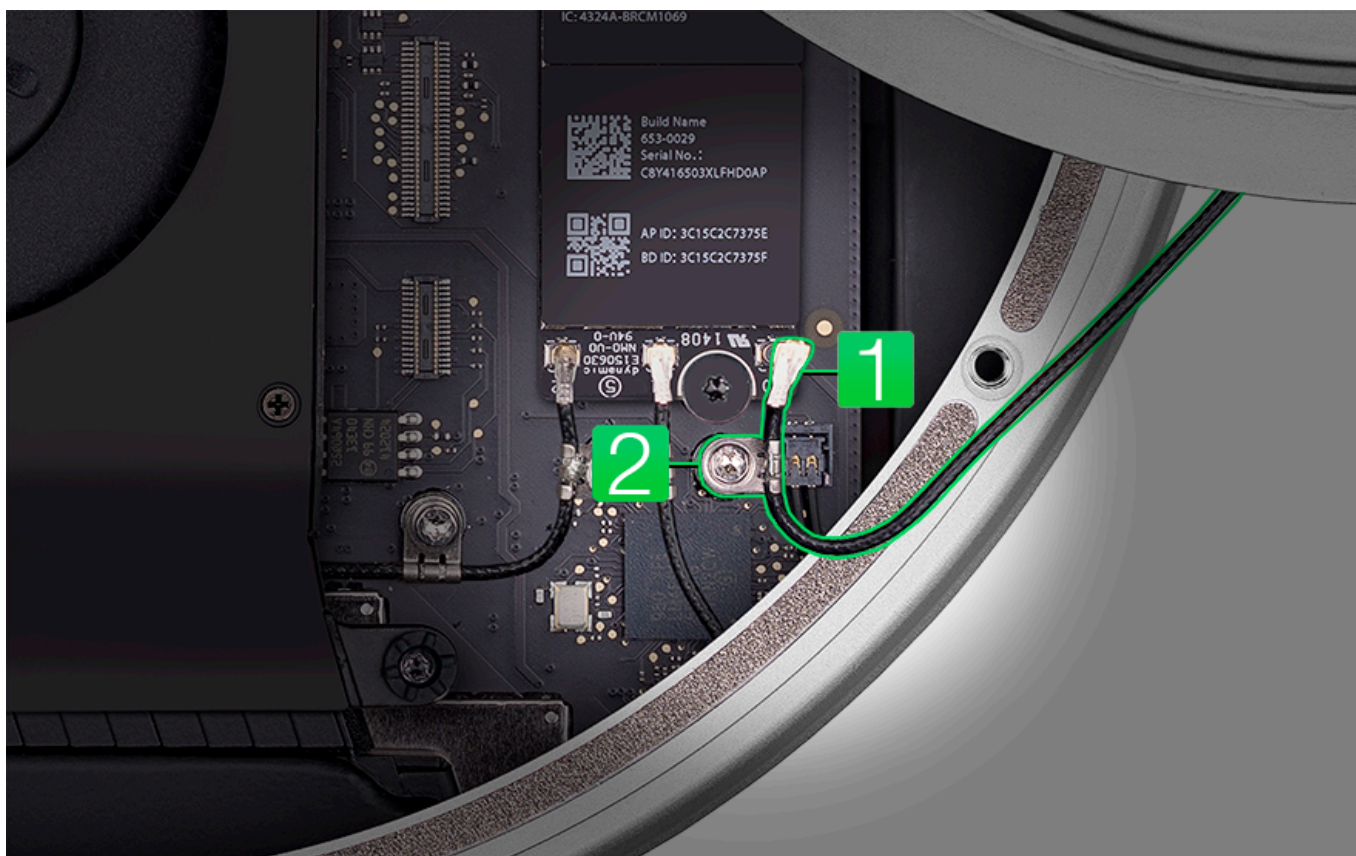


5. Lift the antenna plate off of the housing. Set the antenna plate aside.

### Steps For Reassembly

1. Connect the antenna cable to the wireless card (#1) and install one (1) T6 antenna screw (#2) on the logic board standoff.
  - One (1) 923-00156





2. Use a black stick to gently tuck the antenna cable under the edge of the housing.

3. Rotate the antenna plate counter-clockwise onto the housing. Verify that the antenna cable is not pinched between the housing and the antenna plate before replacing the screws.



**Note:** The antenna plate screws must be tightened to a specific torque value. Set the adjustable torque driver to the lowest



Nm (Newton meter) setting, which would be 0.3 Nm (2.65 in/lbs.).

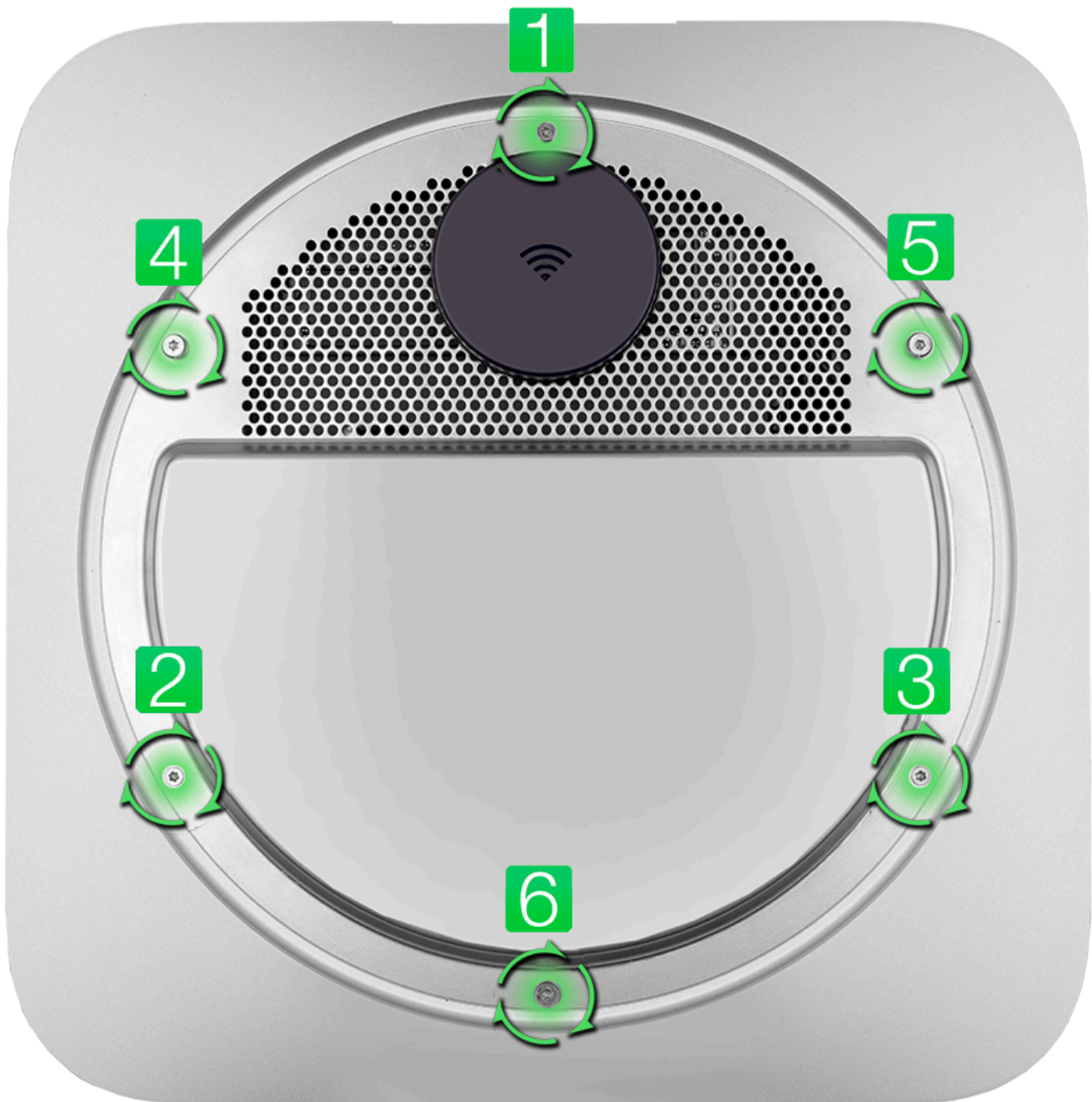
4. Align the antenna plate with the housing.

5. Install six (6) new T6 security screws in the order indicated. **Note:** Do not reuse the original screws.

- Install three (3) new security screws (923-00155) in order, in locations 1, 2, and 3.



- Install three (3) new security screws (923-00157) in order, in locations 4, 5, and 6.



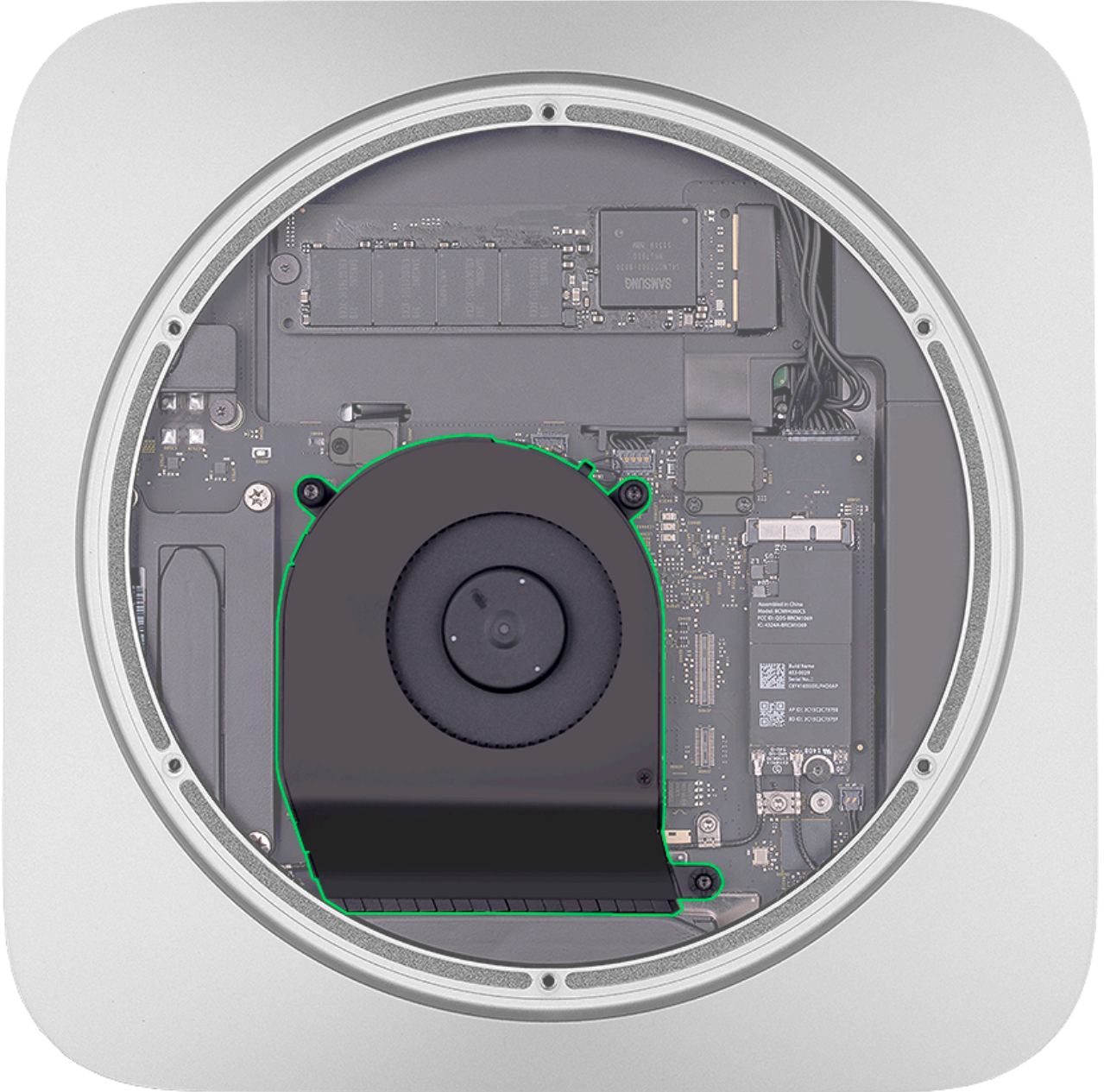
6. Reinstall the [bottom cover](#).

# Fan

## First Steps

Remove:

- [Bottom cover](#)
- [Antenna plate](#)



## Tools

- Black stick
- Torx T6 screwdriver
- Torque driver, preset, 2.0 in-lbs, (923-00308)



## Steps For Removal

1. Remove three (3) T6 fan screws:

- Two (2) 922-9582 (**Note:** screw bumpers are service part number 922-9572)



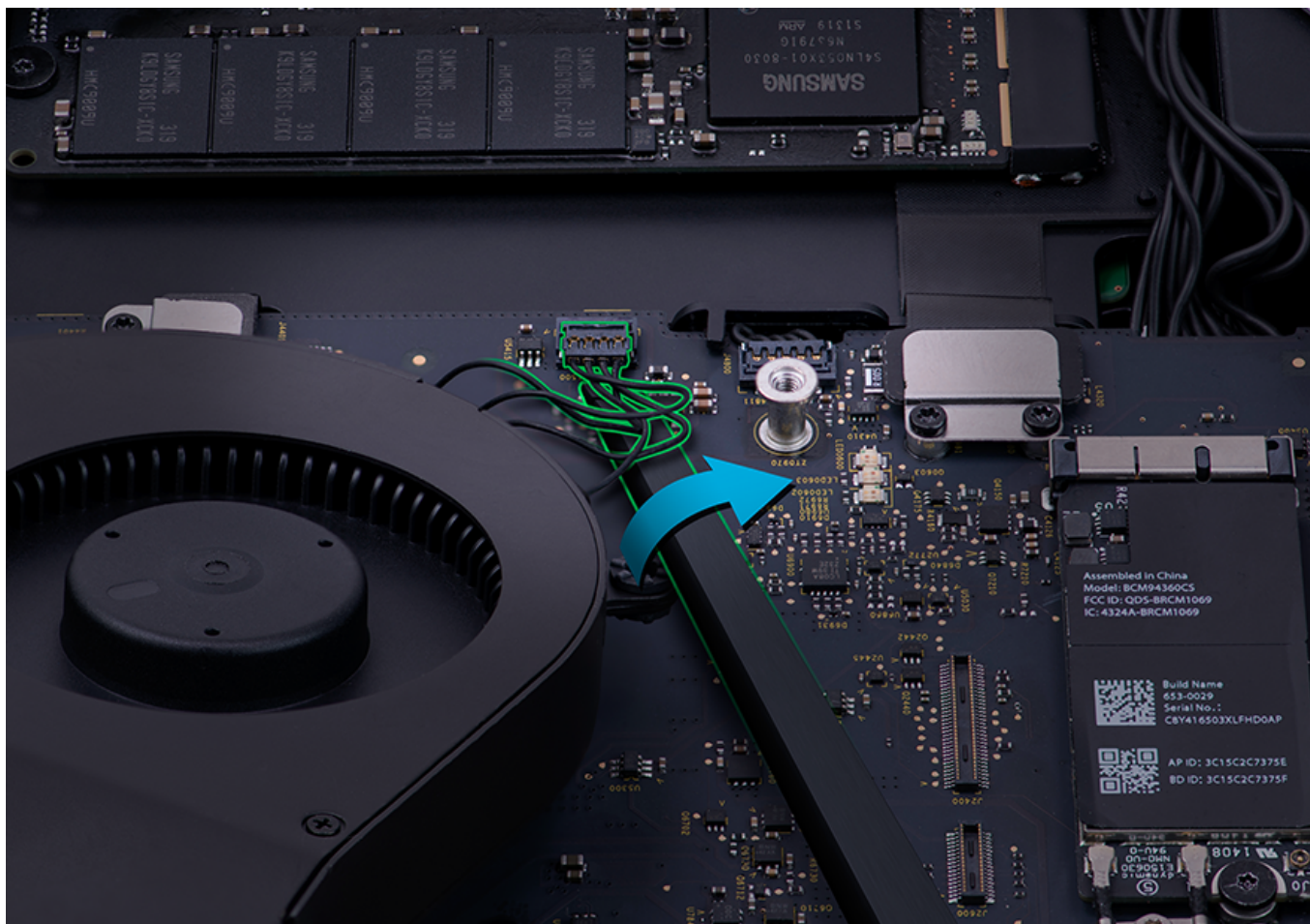
- One (1) 923-0252





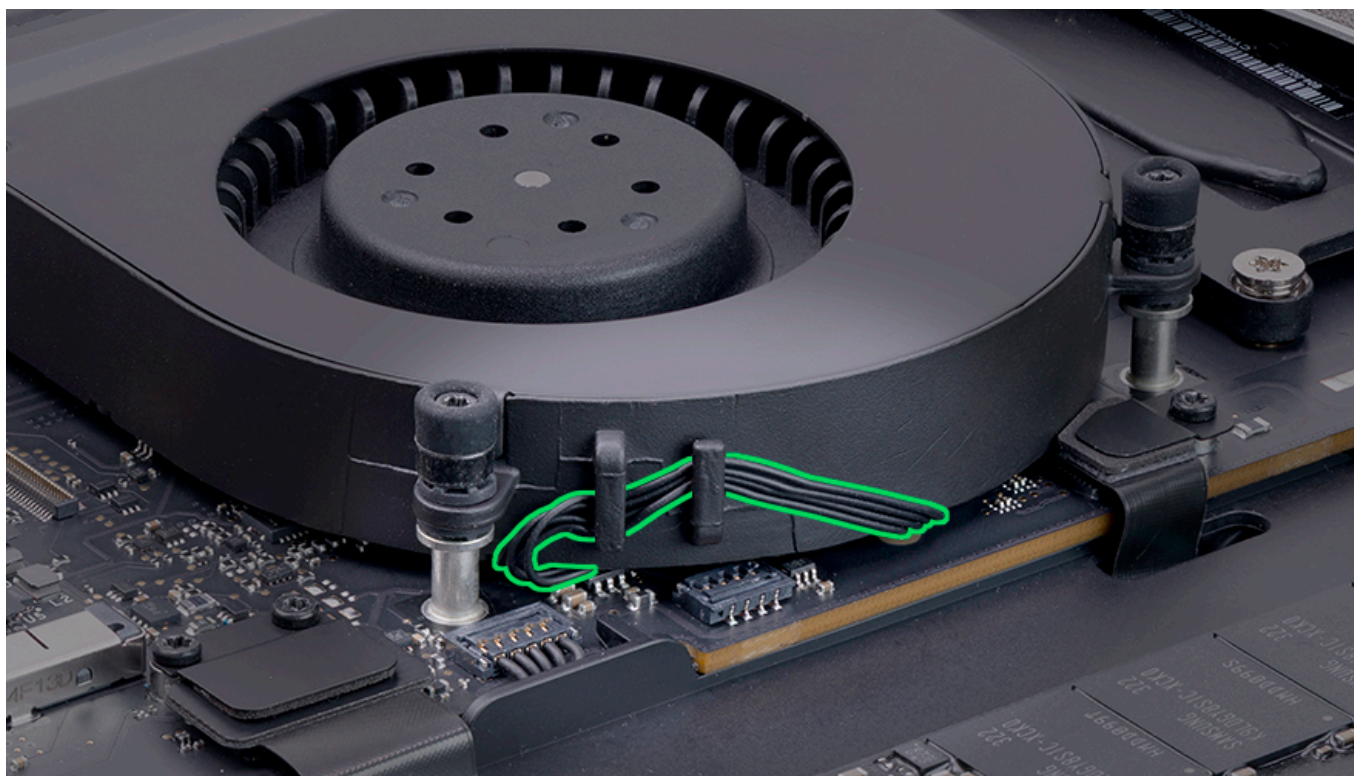






## Steps For Reassembly

1. Check the fan cable routing on the side of the fan. Secure the fan cable with the two fan clips before connecting the fan to the logic board.



2. Connect the fan cable to the logic board.

3. Reinstall the three (3) Torx T6 screws. **Note:** If a replacement fan will be installed, transfer the screws to the replacement fan. Be careful not to dislodge the grommets on the replacement fan.

- Two (2) 922-9582





**Note:** The long fan screw must be tightened to a specific torque value of 2.0 in-lbs. Use the preset torque driver to tighten the screw.

- One (1) 923-0252



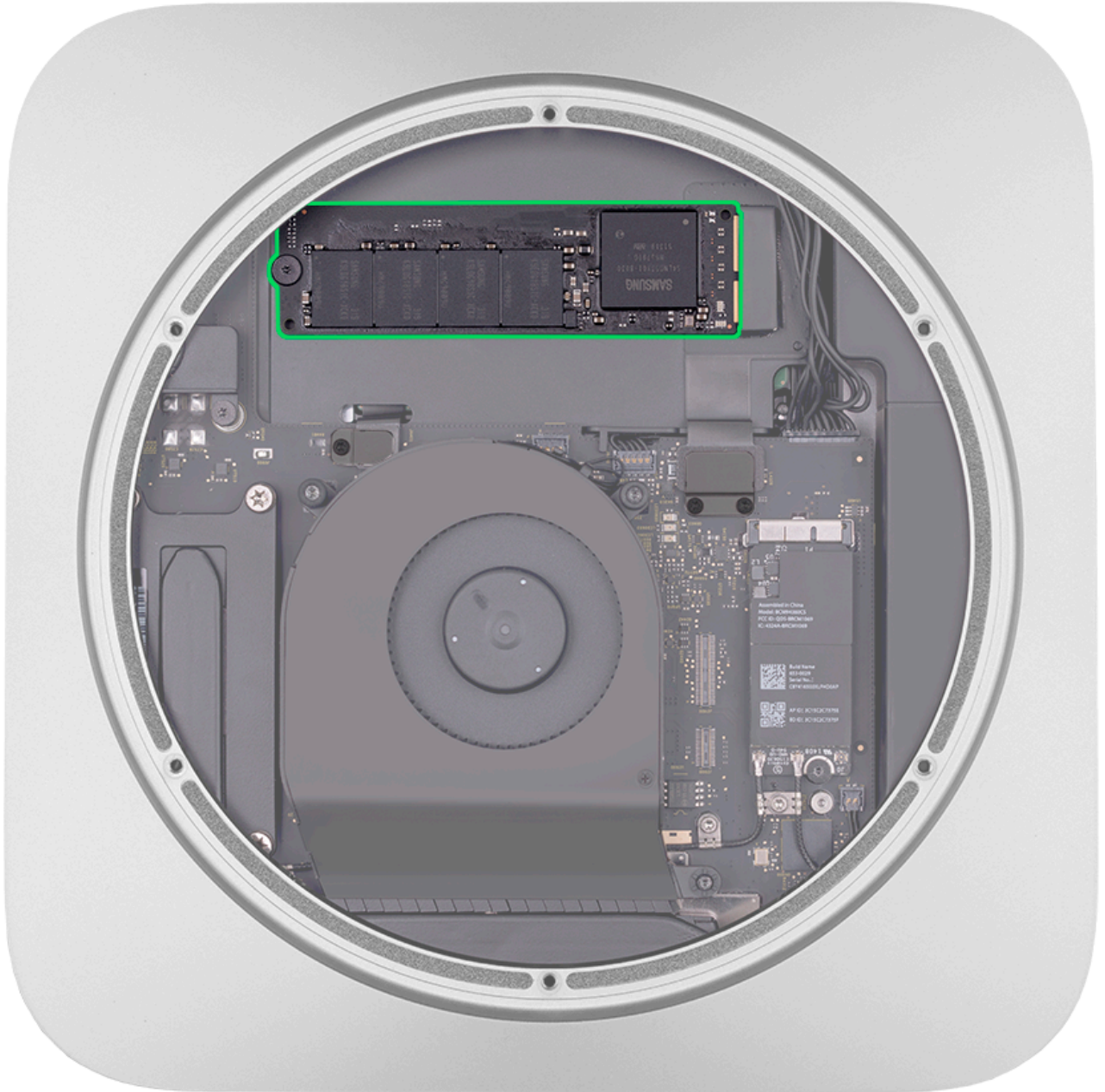
4. Reinstall the [antenna plate](#).
5. Reinstall the [bottom cover](#).

# Flash Storage

## First Steps

Remove:

- [Bottom cover](#)
- [Antenna plate](#)



## Tools

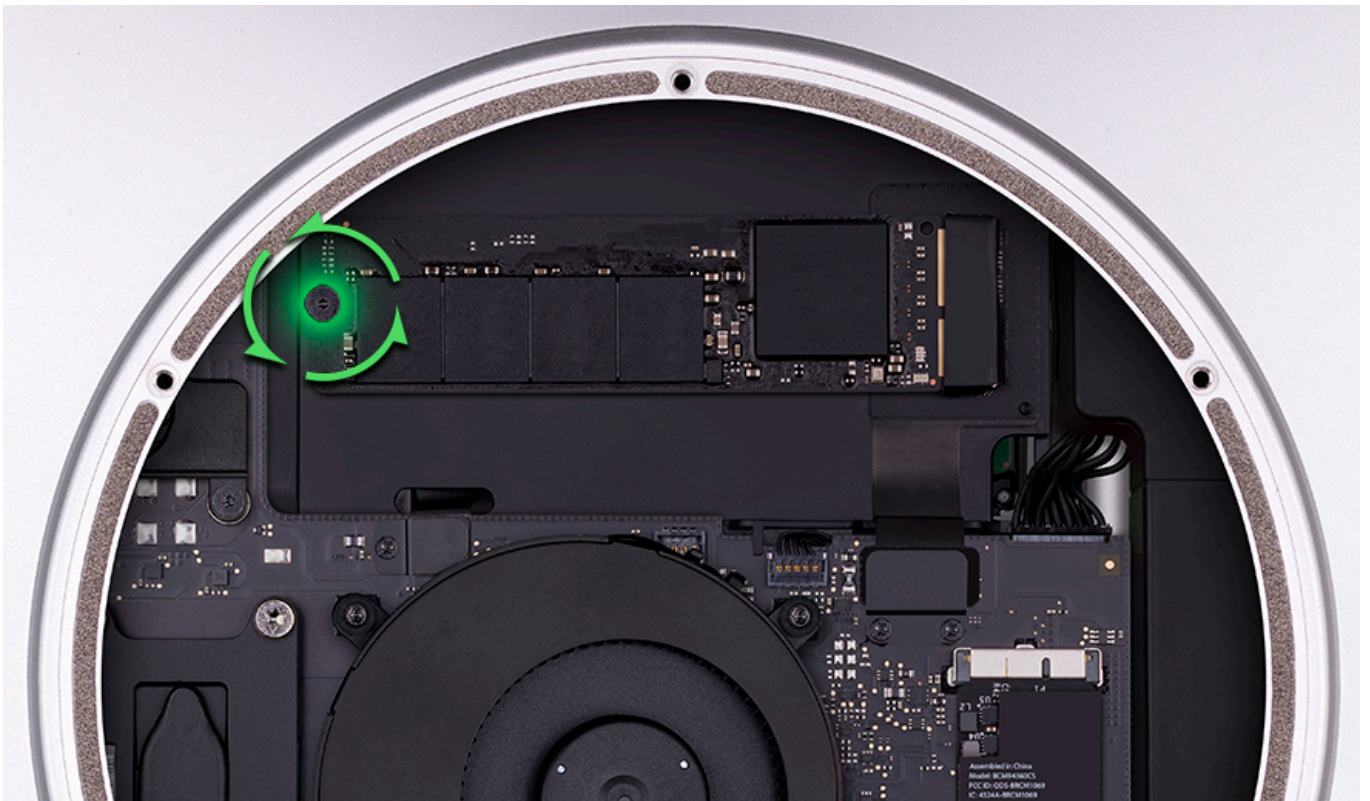
- Torx T5 screwdriver



## Steps For Removal

1. Remove one (1) T5 flash storage screw.

- One (1) 923-00224

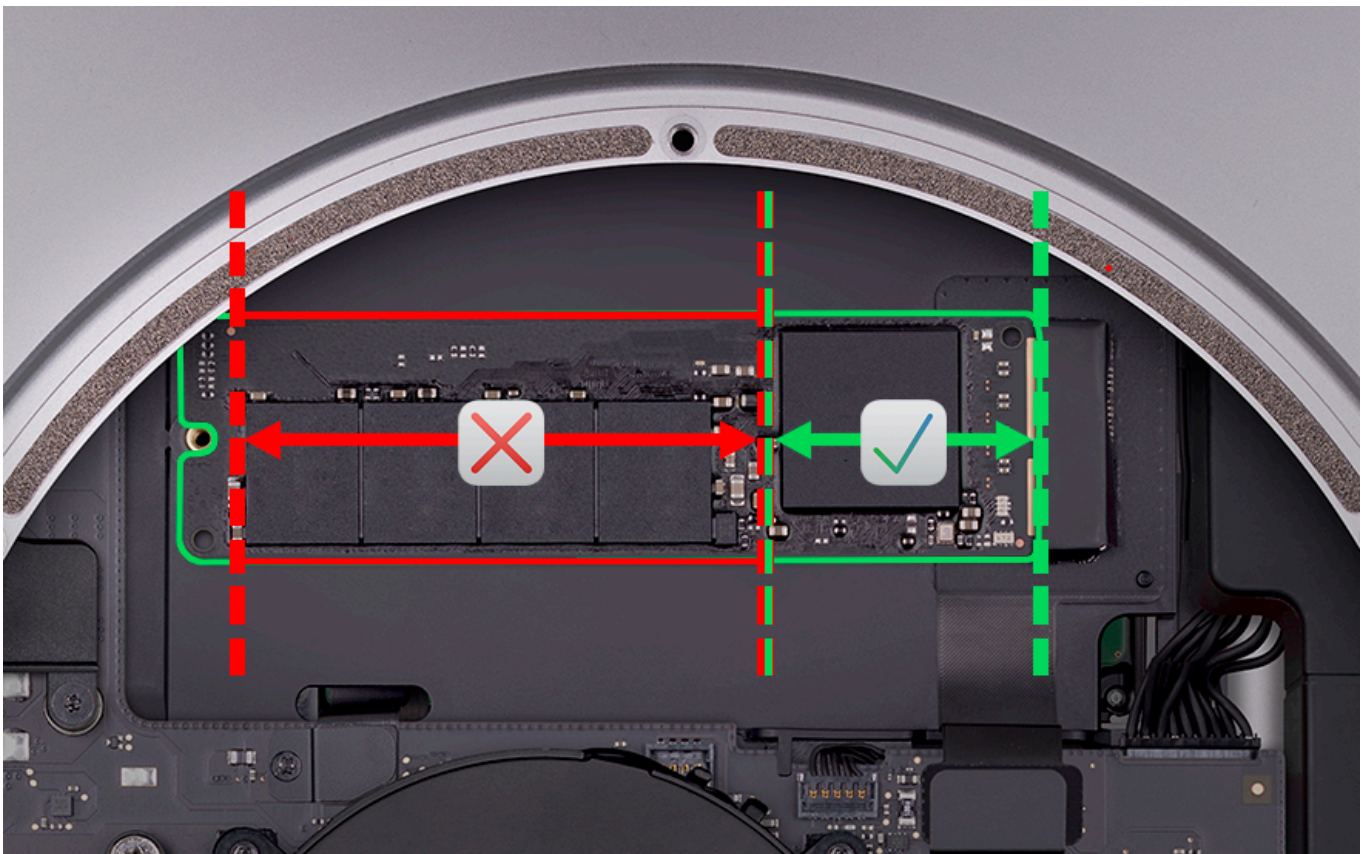


2. Carefully wiggle the card out of the connector, pulling it to the left on the same horizontal plane.

**Caution:** The flash storage card and connector can be damaged if mishandled. Handle the card by the sides (the green area), near the flash storage connector, not in the area with the four smaller integrated circuits (the red area) on the card.

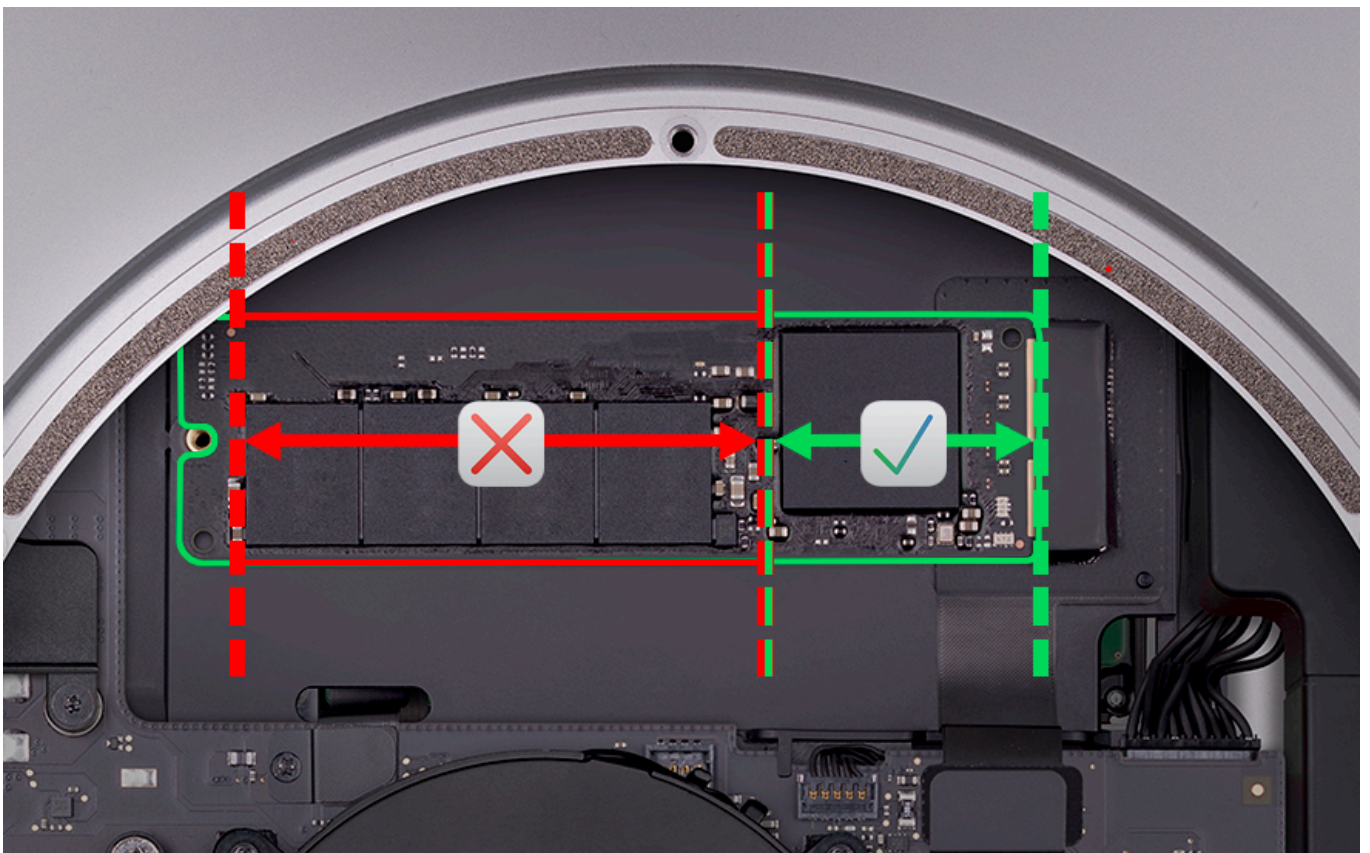
**Caution:** To avoid damaging the connector on the logic board, never lift the flash storage card at an angle during removal or reassembly.





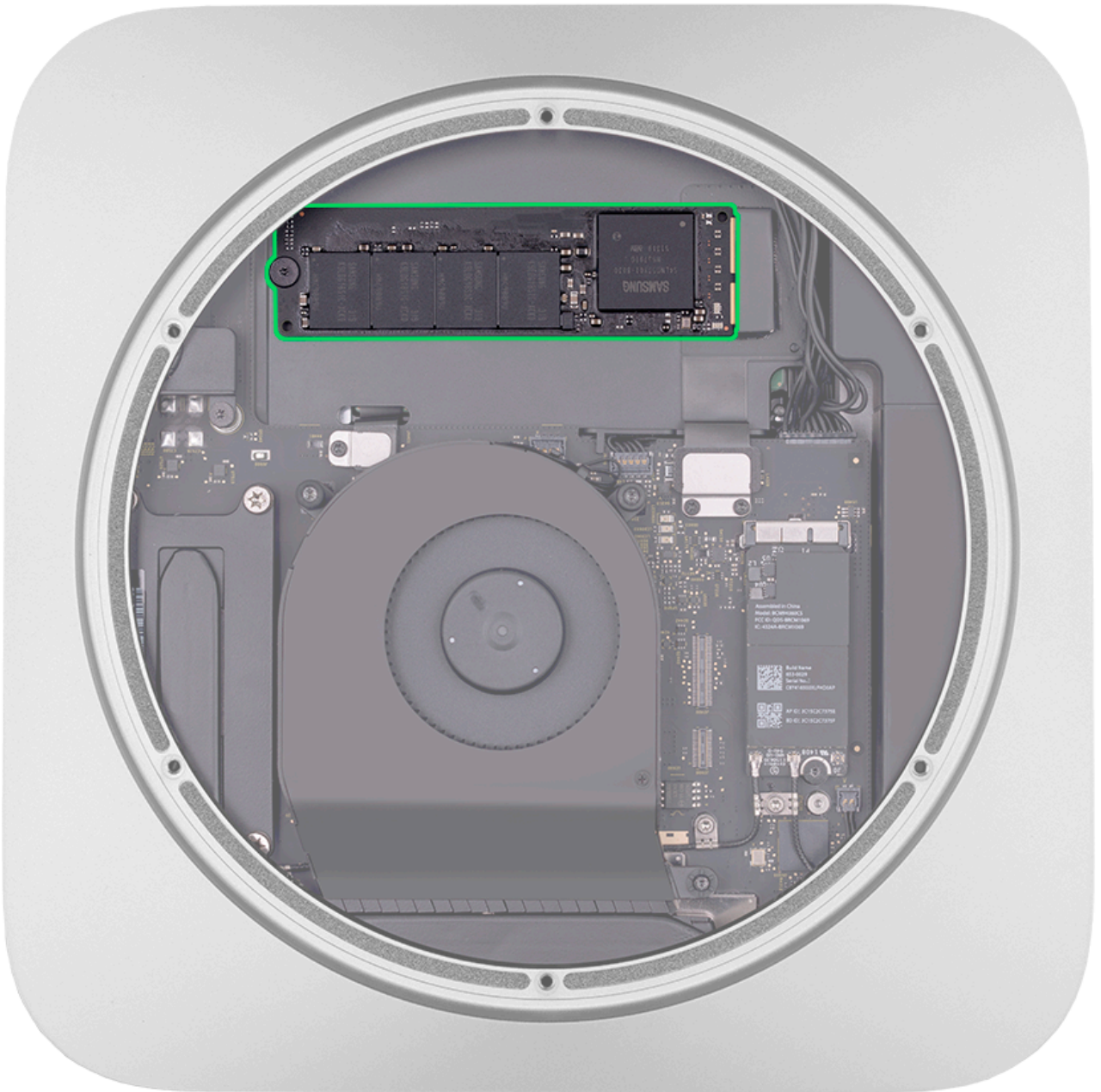
### Steps For Reassembly

1. Carefully insert the flash storage card straight into the connector. Handle the card by the sides (the green area), near the flash storage connector, not in the area with the four smaller integrated circuits (the red area) on the card.



2. Replace one (1) T5 screw.





3. Replace the [bottom cover](#).

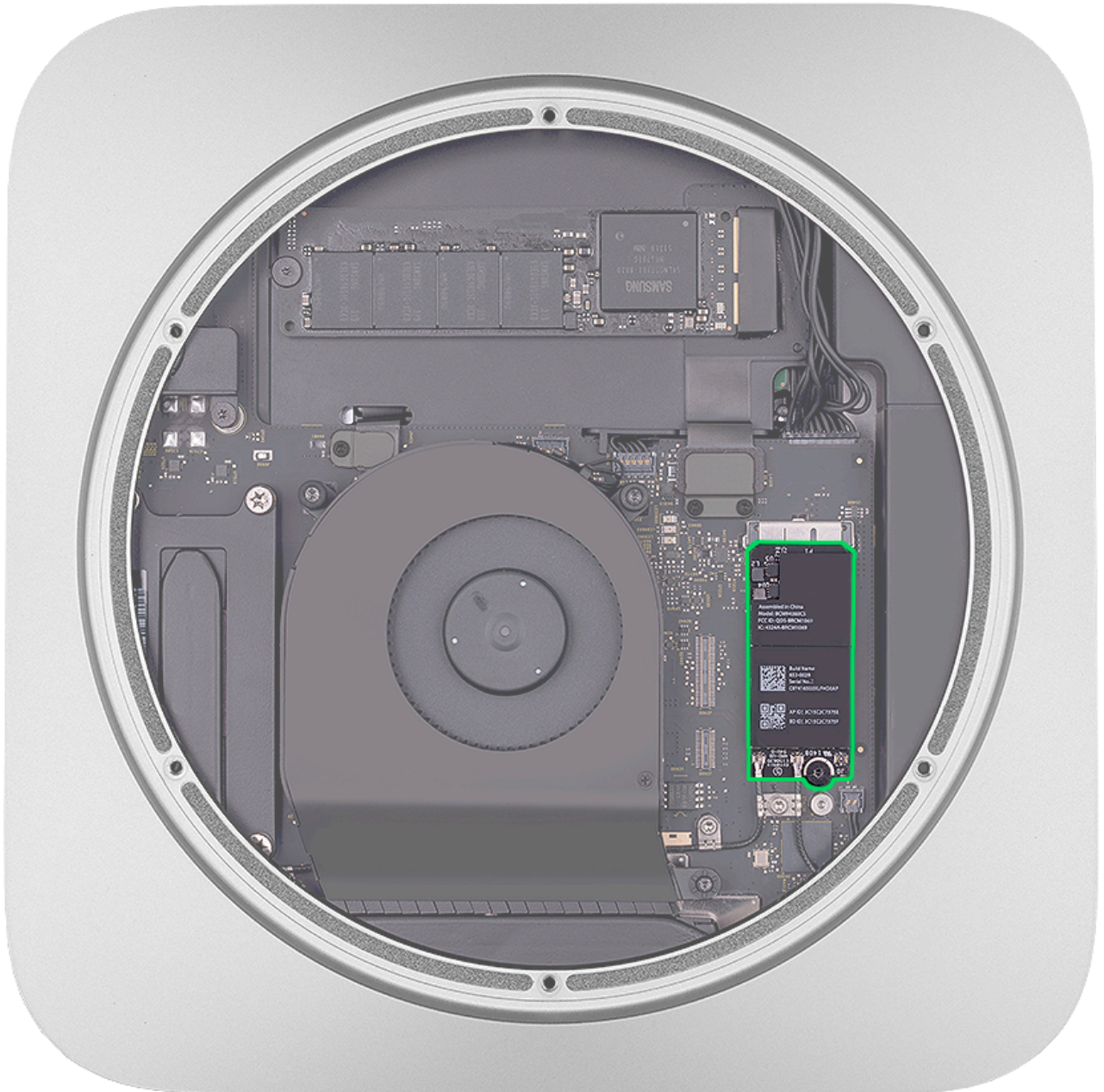
4. Replace the [antenna plate](#).

# Wireless Card

## First Steps

Remove:

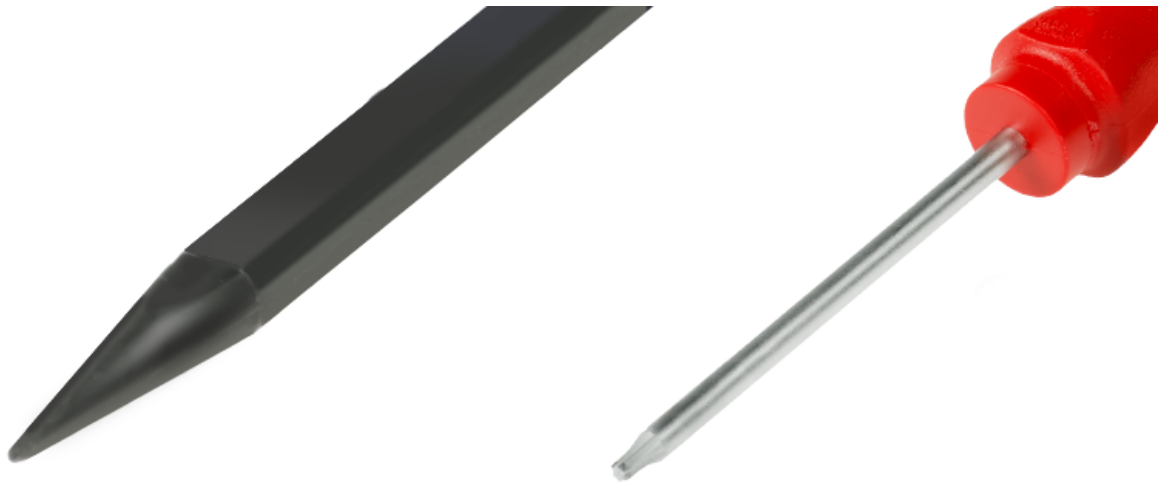
- [Bottom cover](#)
- [Antenna plate](#)



## Tools

- Black stick
- Torx T5 screwdriver (magnetized)
- Torx T6 screwdriver (magnetized)





## Steps For Removal

1. Remove one (1) T6 screw (#1) that attaches the antennas to the logic board standoff. Use a black stick to disconnect the antennas (#2) from the wireless card.

- One (1) 923-00156



**Replacement Note:** Position the antenna (with the captive washer) on top of the antenna on the left.

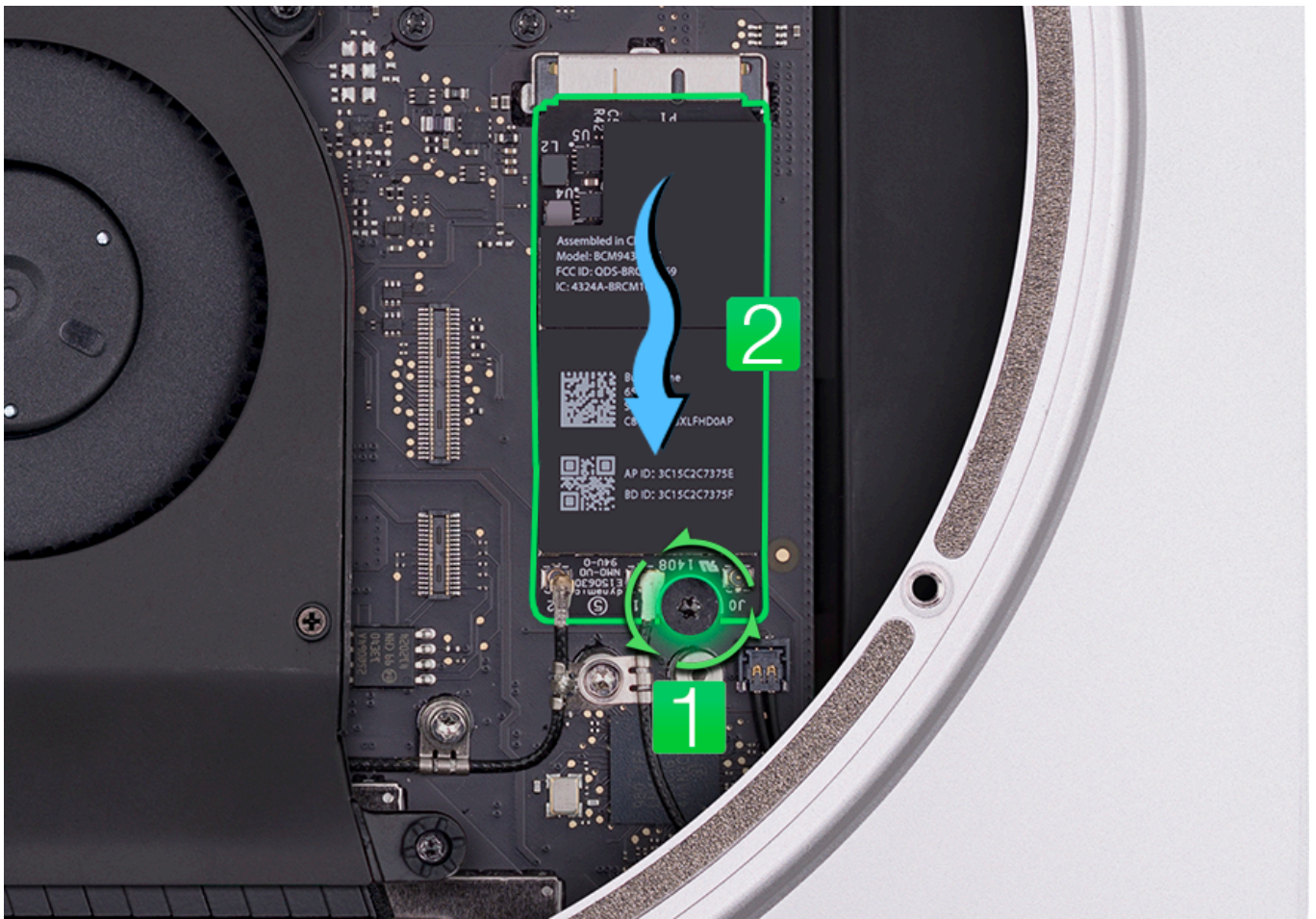


2. Remove one (1) T5 screw (#1) from the wireless card.

- One (1) 923-00223



3. Hold the card near the wireless card connector and wiggle the card (#2) straight out of the connector. **Important:** Do not remove or insert the wireless card at an angle. This could damage the wireless card connector, requiring a logic board replacement.

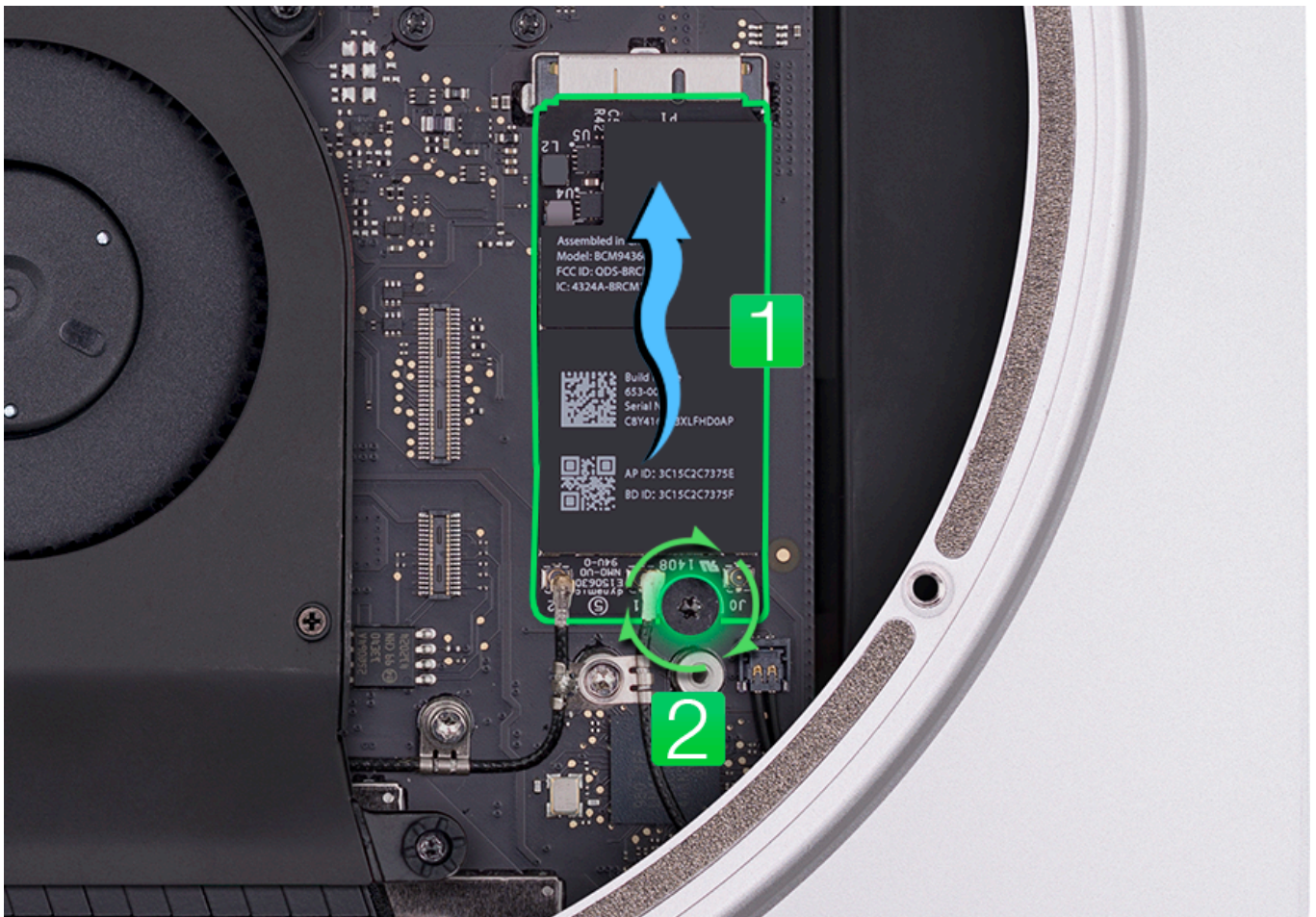


## Steps For Reassembly

1. Hold the wireless card near the gold contacts and push the card (#1) firmly into the wireless card connector until it is fully seated.
2. Install one (1) new T5 screw (#2) on the wireless card. **Note:** Do not reuse the original screw. Order wireless card screws, 923-00223, Pkg. of 5.







3. Connect the antennas to the wireless card.



4. Place the antenna (with the captive washer) on top of the other antenna mounting tab.

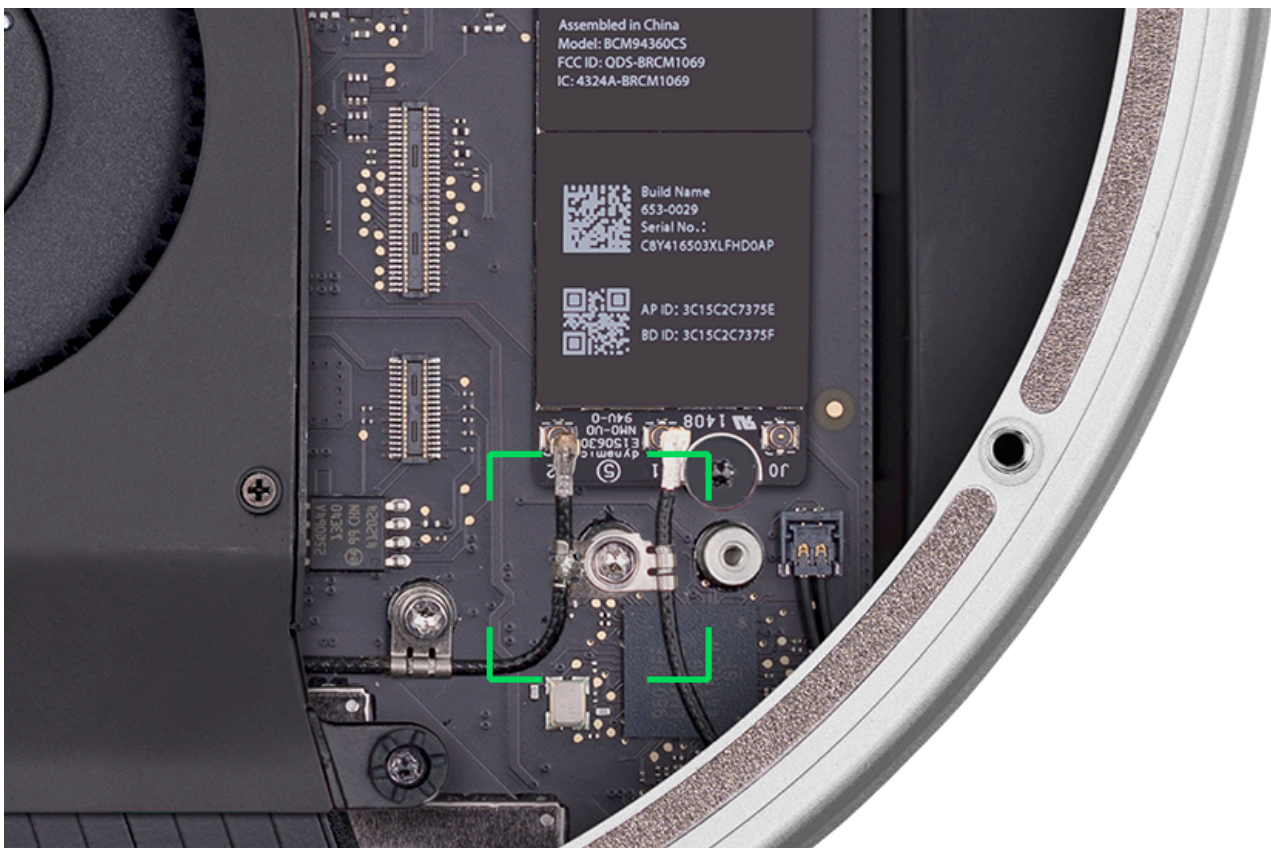
**Antenna with captive washer**





5. Reinstall one (1) T6 screw to secure the antenna mounting tabs to the logic board standoff.

- One (1) 923-00156



6. Reinstall the [antenna plate](#).



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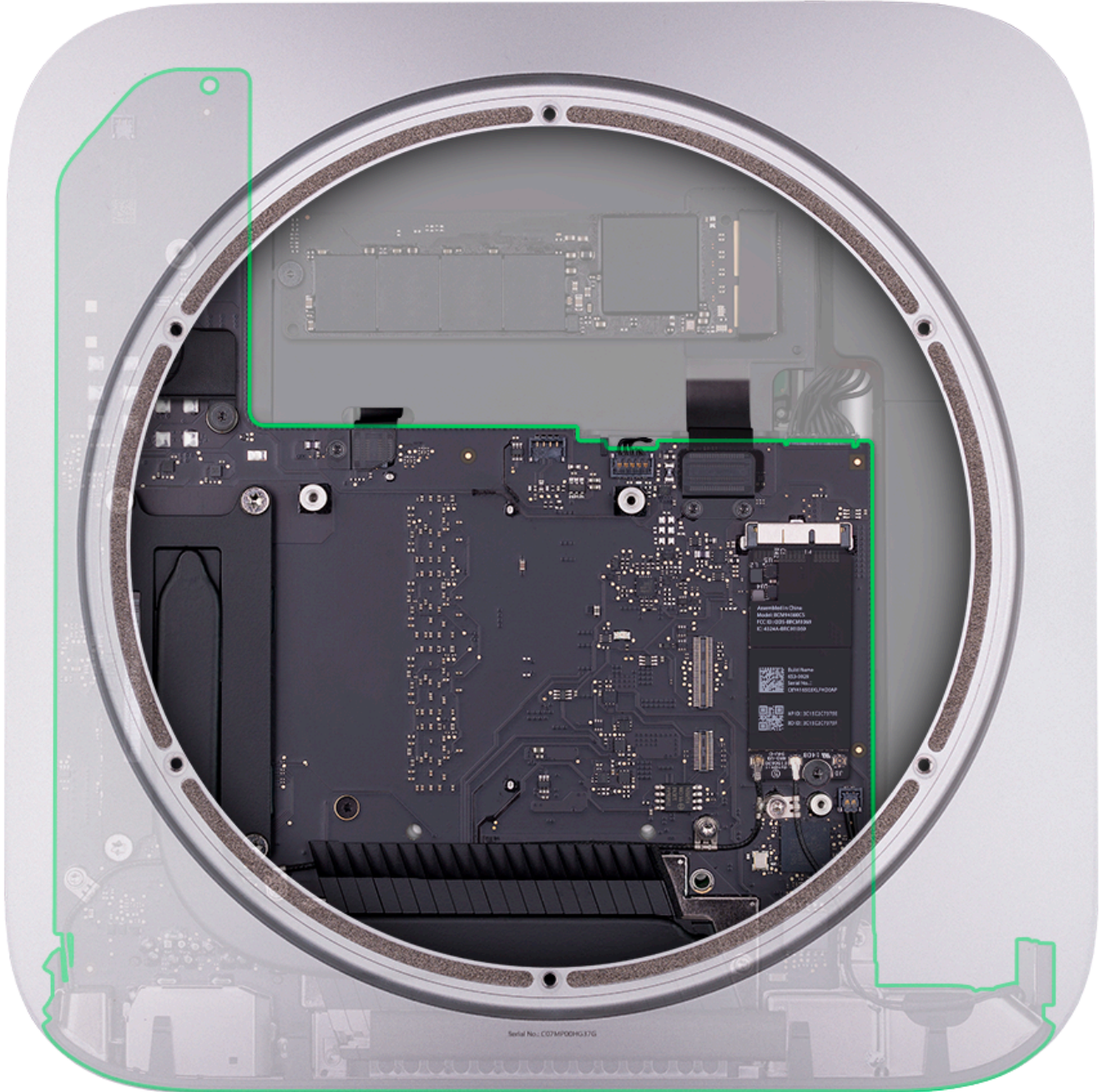
7. Reinstall the [bottom cover](#).

## Logic Board

## First Steps

Remove:

- Bottom cover
- Antenna plate
- Fan



## Tools

- Torx T6 screwdriver (magnetized)
- Black stick
- ESD-safe tweezers
- Logic board removal tool (922-9588)
- Torque driver, preset 2.0 in-lbs (923-00308)

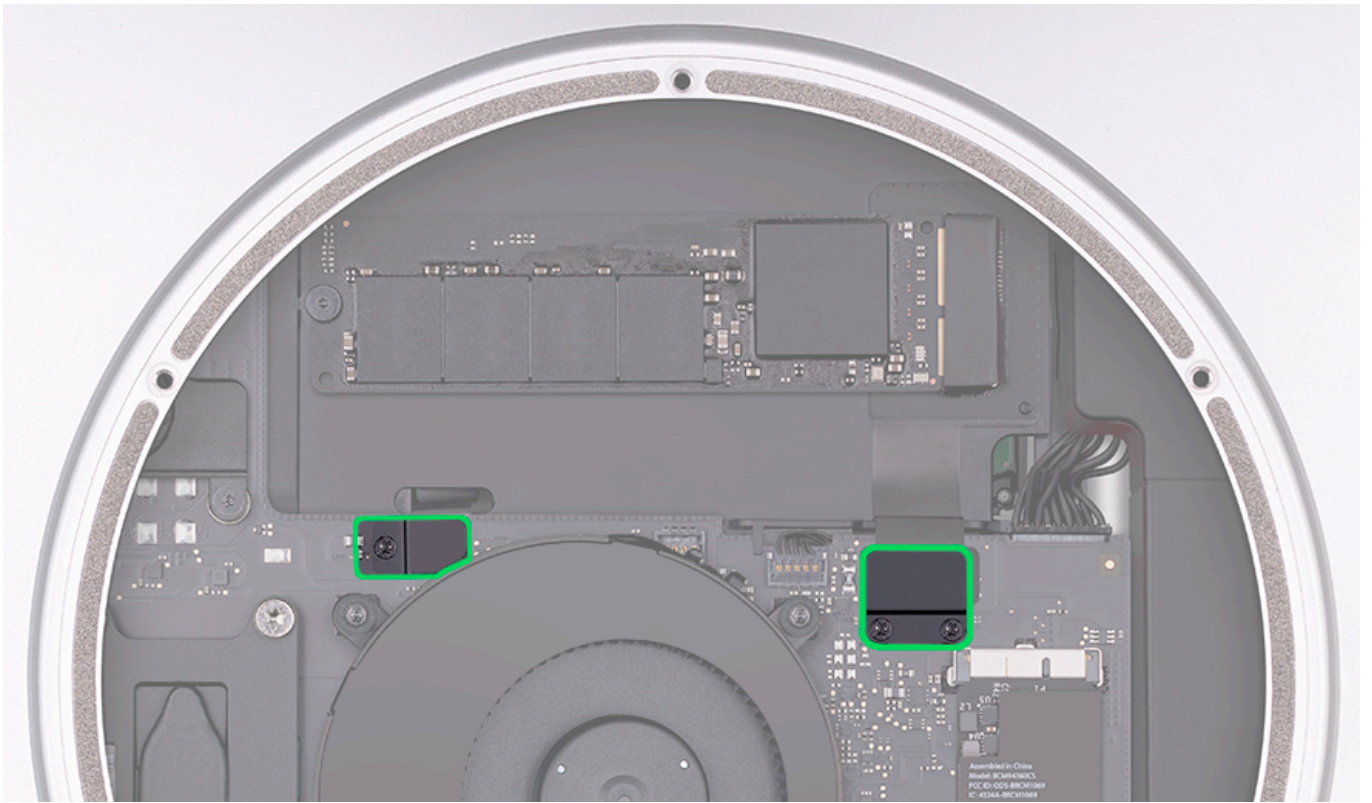


## Steps For Removal

1. Remove three (3) T6 retainer plate screws; one (1) from the hard drive retainer plate and two (2) from the flash storage retainer plate. Set the retainer plates aside.

- 923-00316



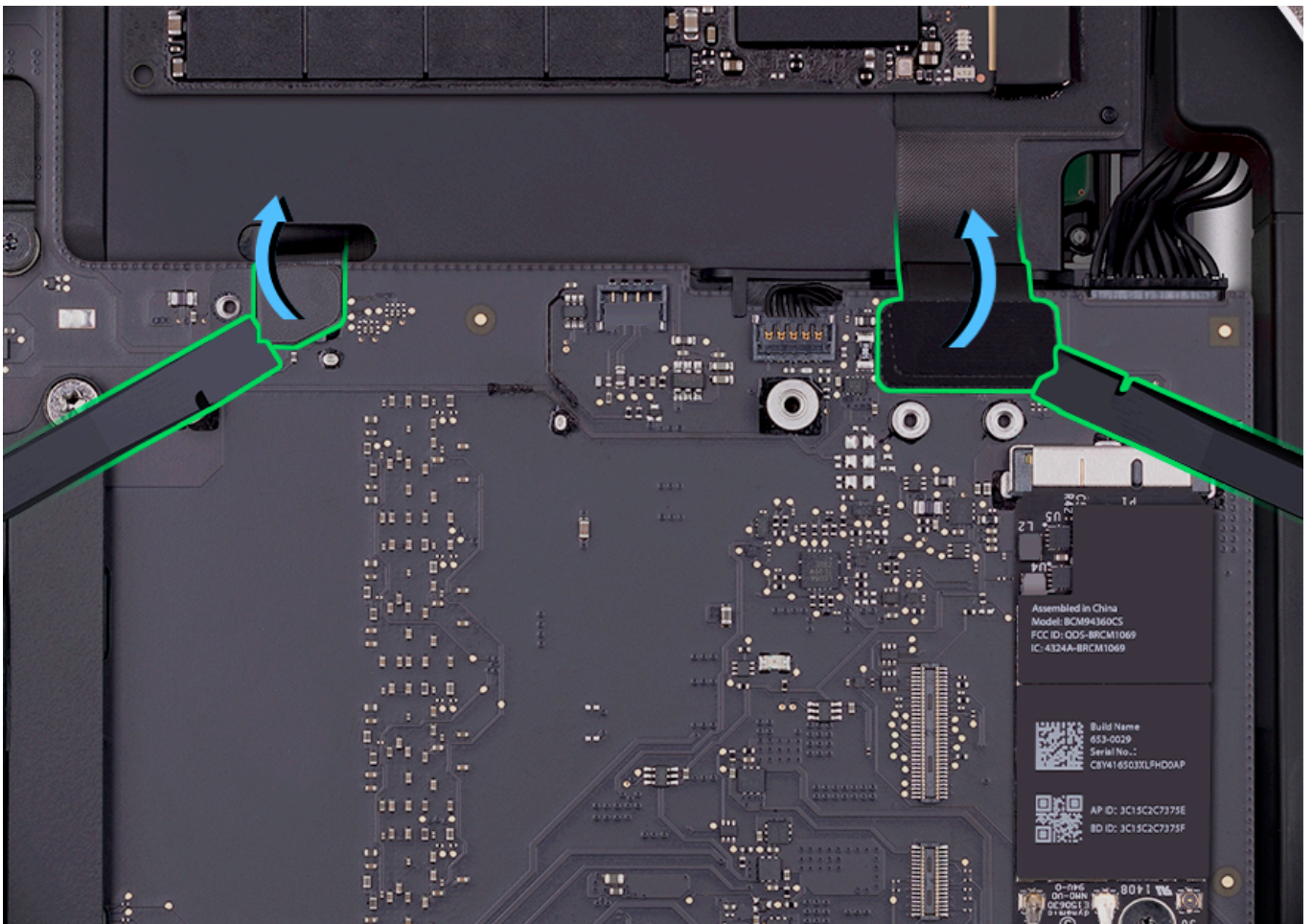


**WARNING:** Logic board cable connectors and sockets are fragile. Use extreme care and finesse when disconnecting cables.

Refer to Apple Support article [TP706: Connector Types on Logic Board](#).

2. Use the flat end of a black stick to flip up the flex cable connectors in one motion. Never rock the connector, which can cause damage.

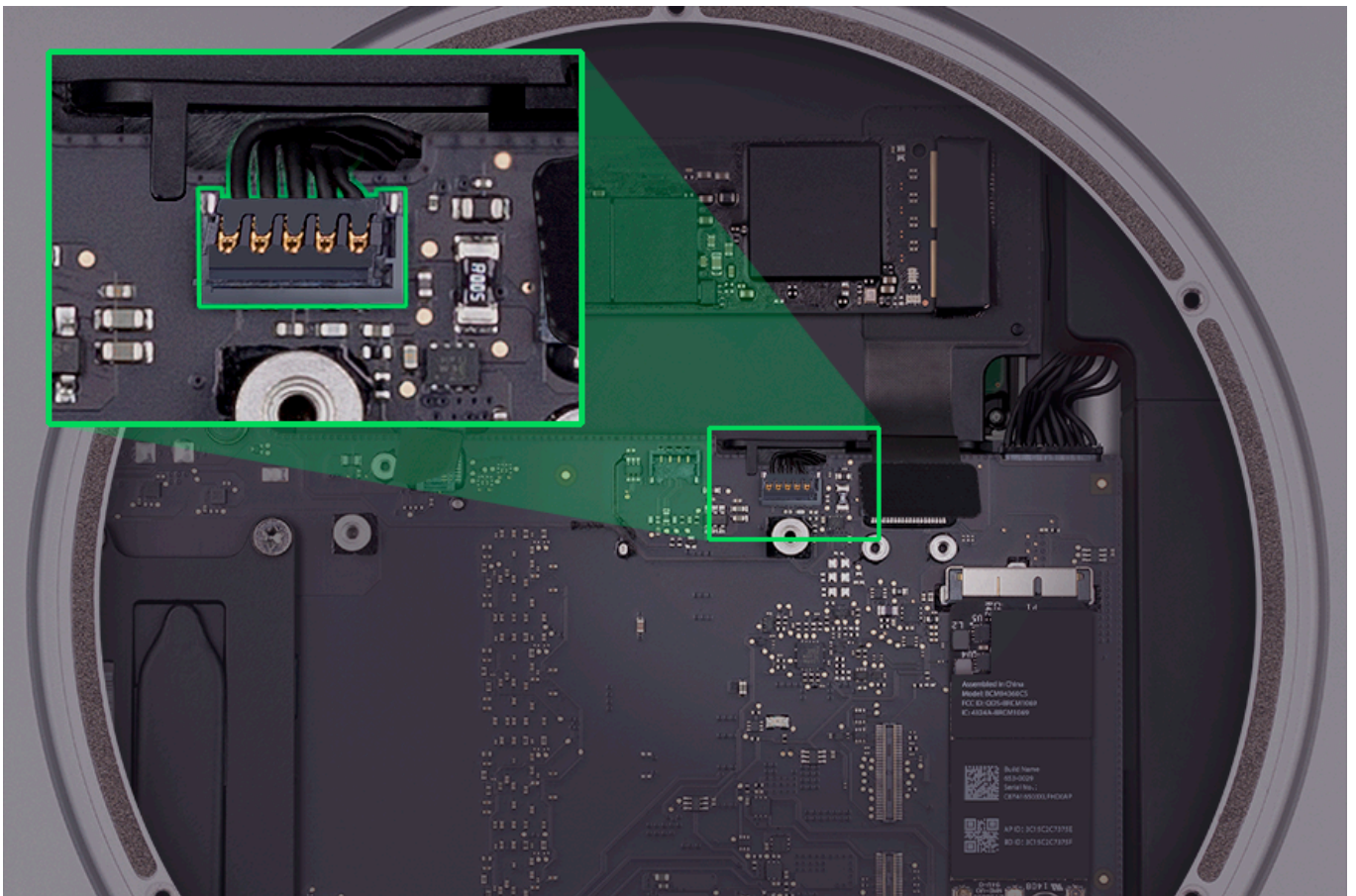




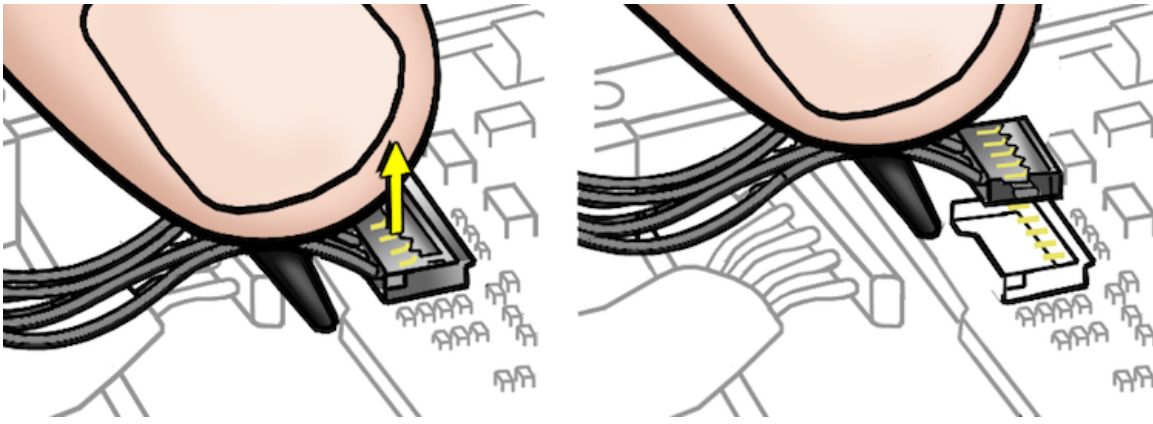
3. Disconnect the infrared (IR) board cable. **Important:** JST connectors are very fragile. Carefully use a black stick to loosen and lift the connector straight up out of its socket on the logic board.

Try capturing cables with tweezers, or with your finger and the pointed end of a black stick, just behind the connector.

Refer to the JST connector topic in Apple Support article [TP706: Connector Types on Logic Board](#).







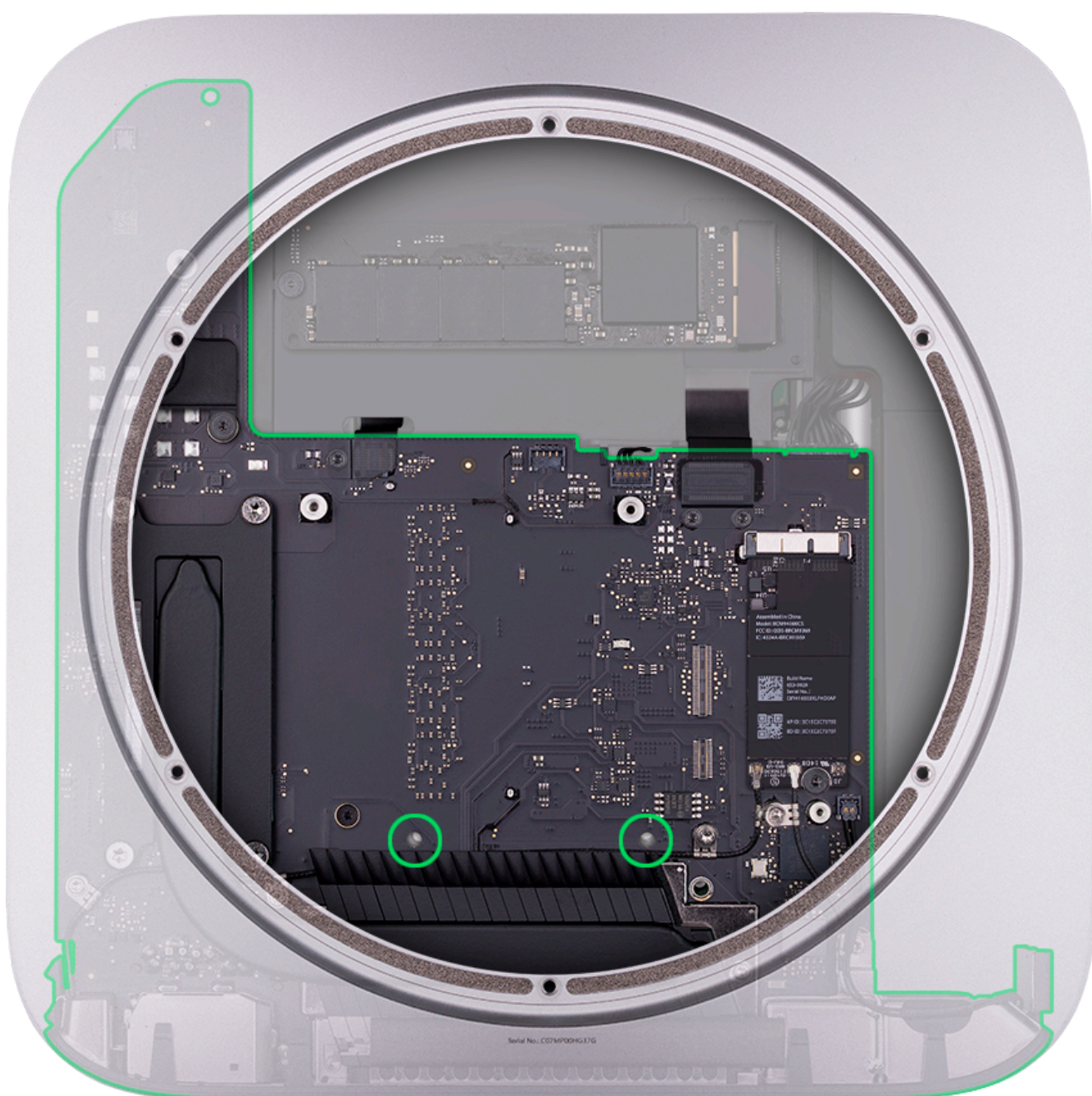
4. Remove one (1) long black T6 screw from the lower left corner of the logic board.

- 922-9959



5. Insert the logic board removal tool into the two holes (circled in the image below) on the logic board. Check that the tool is firmly seated.

**Caution:** Do NOT insert the removal tool, or anything else, into the screw holes. This will damage the logic board by displacing the screw guides underneath.







6. Carefully push down on the tool and pull the tool forward, toward the I/O wall, until the I/O wall separates from the housing about one-half inch (12.7 mm).



7. Disconnect the power supply cable from the logic board.



8. Remove the logic board removal tool (#1) and carefully pull the logic board (#2) straight out of the housing, supporting the board by the edges.





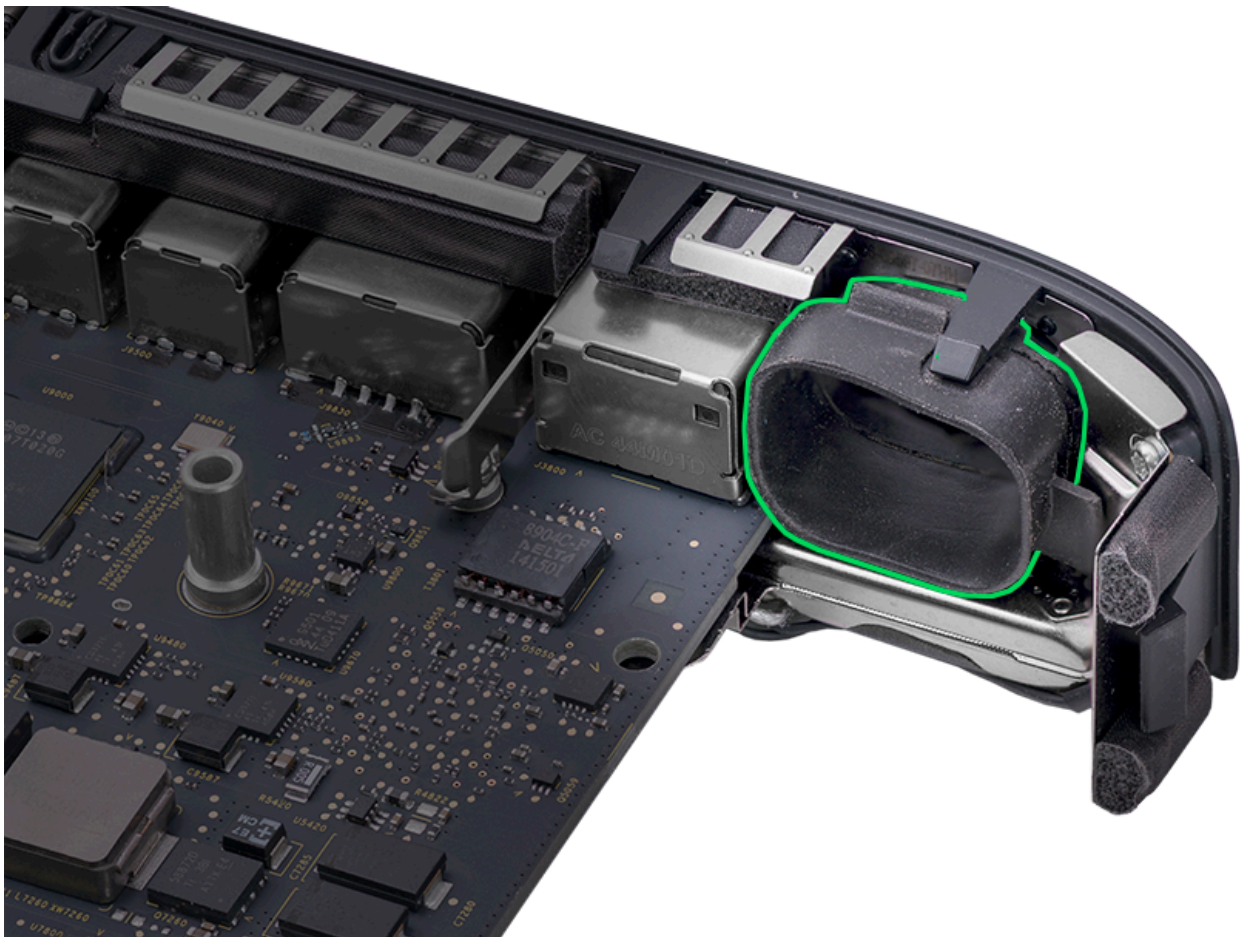
9. **Replacement note:** When returning the board to Apple, be sure to include the battery, but remove the speaker and wireless card and transfer them to the replacement logic board.

**Note:** If installing a replacement logic board, use Blank Board Serializer to set the computer's serial number.

### Steps For Reassembly

1. Before installing the logic board, check that the AC sleeve is positioned correctly and securely seated in the AC inlet (as shown).

**Note:** The AC sleeve comes in a separate bag with the replacement logic board. To install the AC sleeve, remove the adhesive backing from the sleeve and install it as shown.



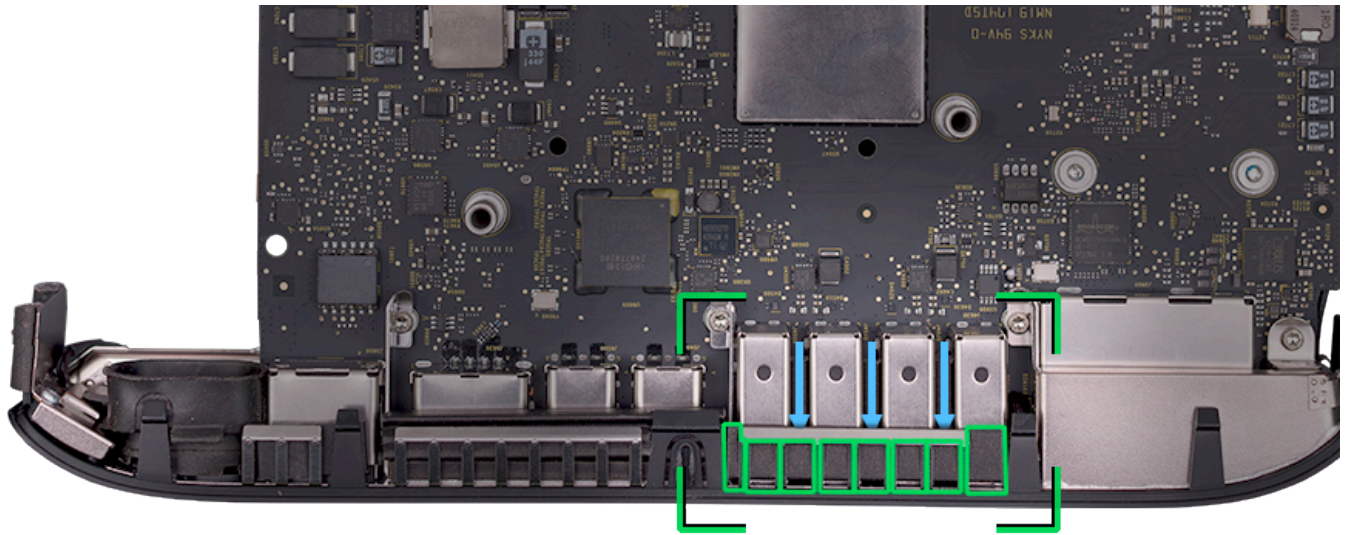
2. Check the three (3) EMI foam gaskets on the I/O wall before replacing the logic board. Two gaskets are on the side, near the AC sleeve, and the other gasket is along the top of the I/O wall.

- Inspect two (2) EMI gaskets near the AC sleeve before reinstalling the logic board. If they are dented, damaged, or peeling away from the I/O wall, replace the gaskets. Order service part number 923-00322: EMI foam gaskets.





- Check that the long EMI gasket is tucked under the EMI fingers. **Note:** This EMI gasket is not glued to the rear housing and may move out of place when the logic board is removed.

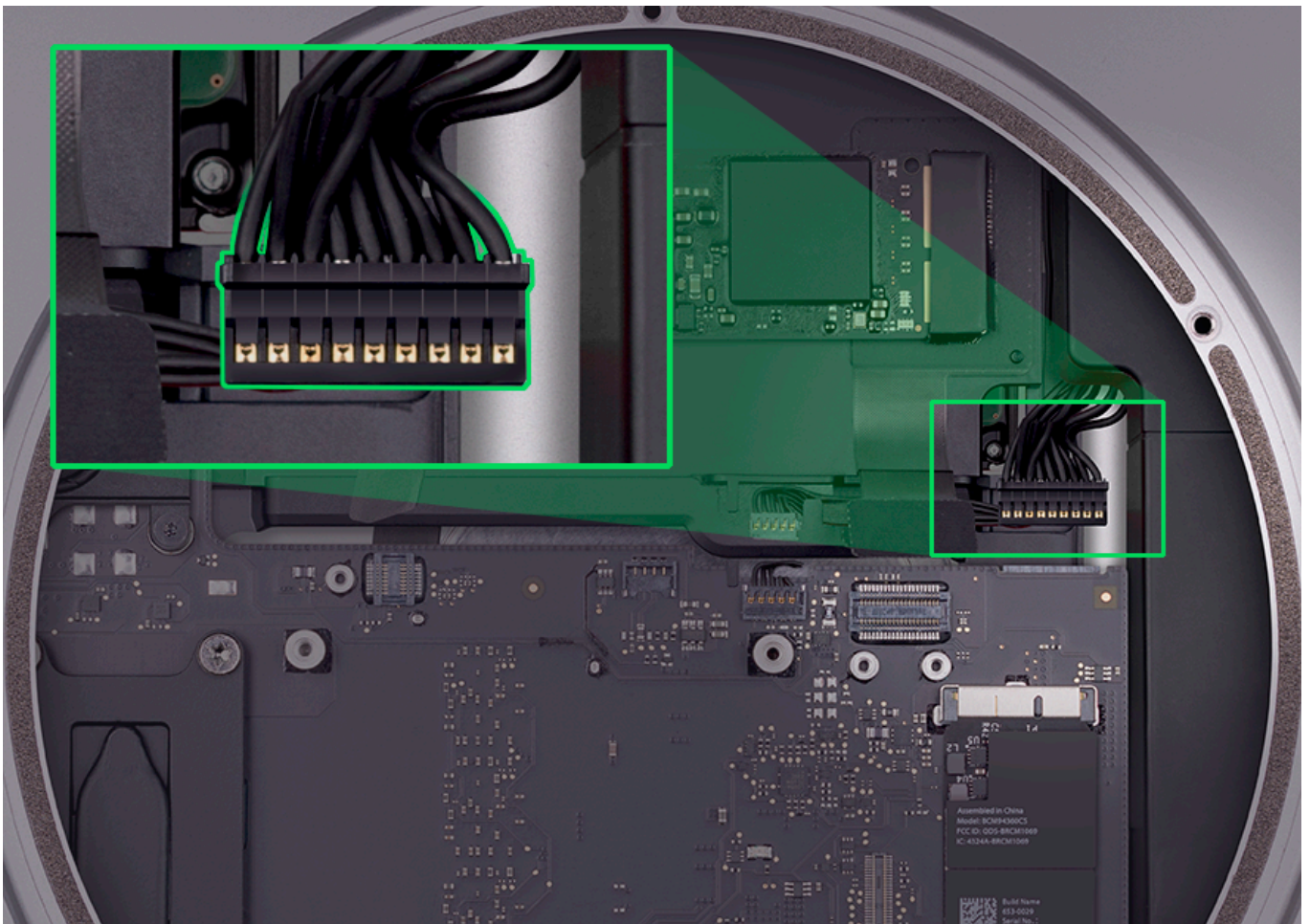


3. Carefully slide the logic board most of the way into the housing. Check that the EMI foam gaskets (on the left side) and metal EMI fingers (on the right side) do not catch on the housing as you install the logic board. If the EMI foam gaskets are damaged, remove and replace them.

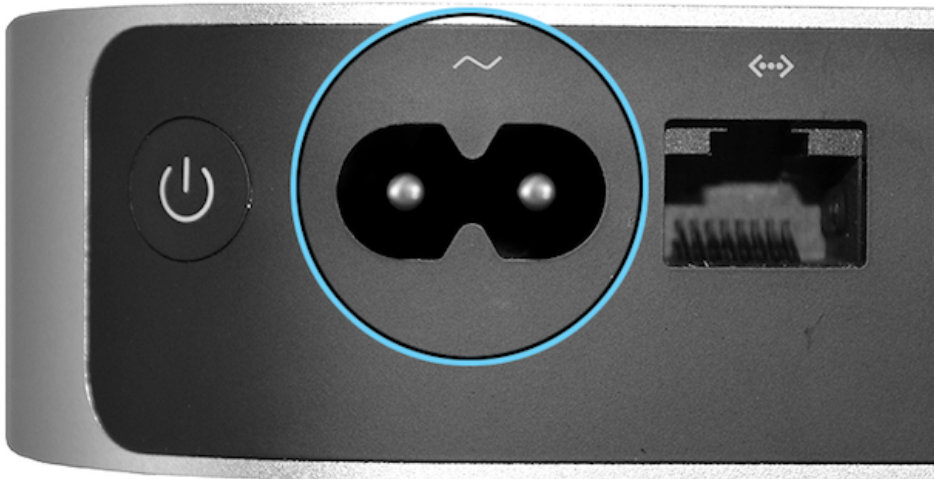


4. Orient the power supply cable with the gold fingers facing up. Connect the power supply cable to the logic board.





5. Slide the logic board the rest of the way into the housing. Once the logic board is fully inserted, check the AC outlet to ensure that no part of the AC sleeve is visible.



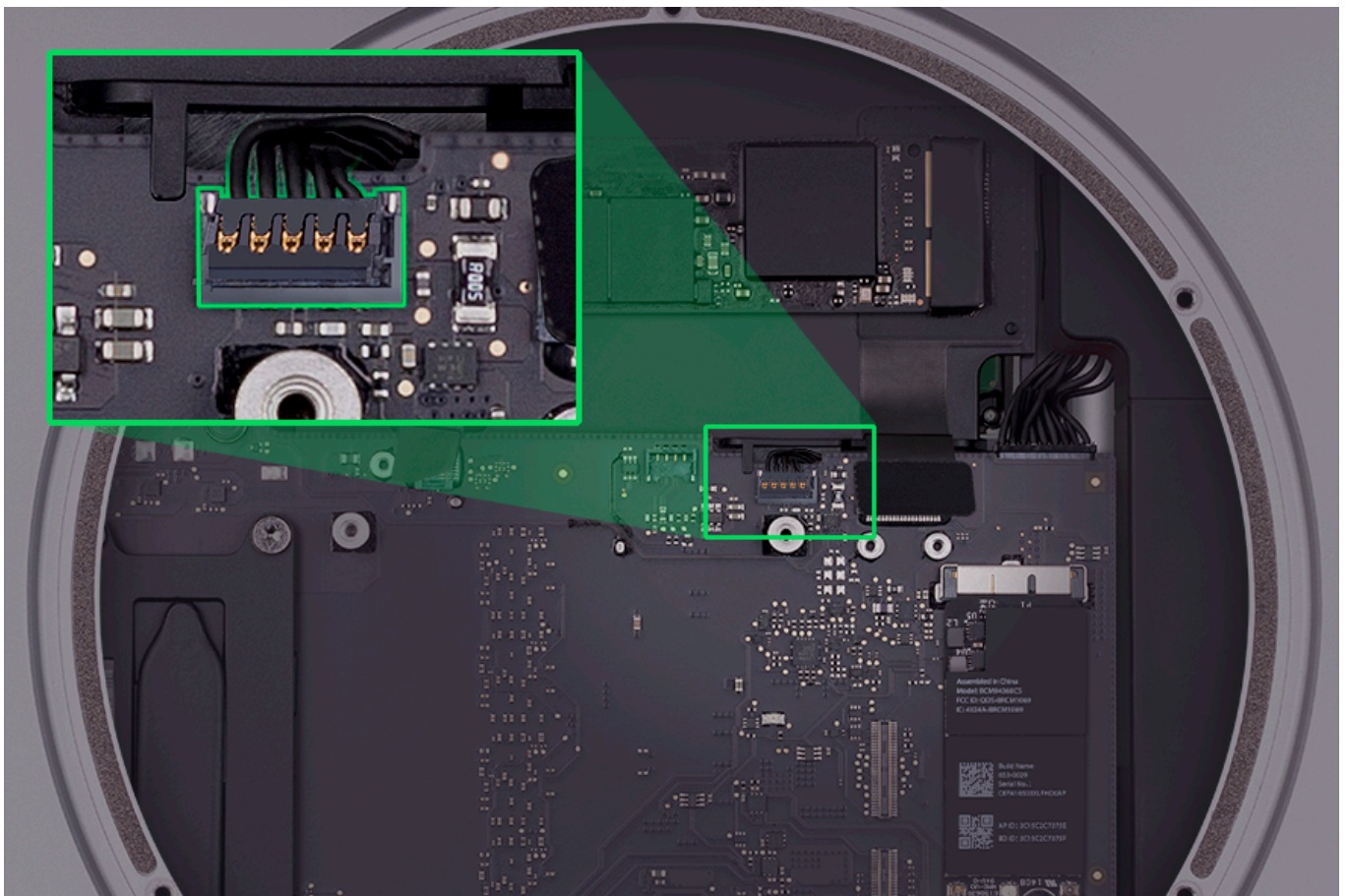
6. Use the preset torque driver (923-00308) to reinstall one (1) long T6 logic board screw. **Note:** The screw must be tightened to a torque value of 2.0 in-lbs.







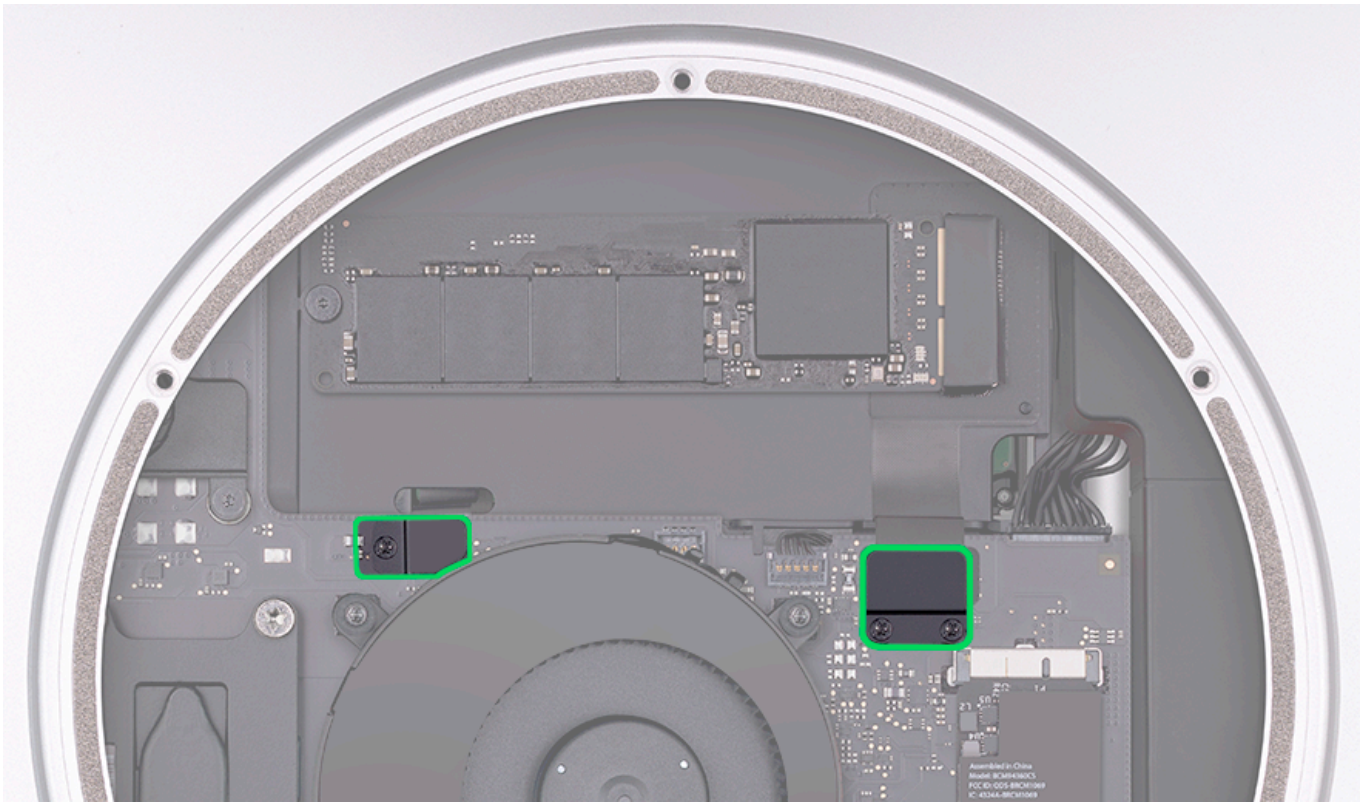
7. Connect the IR (infrared) cable to the logic board.



8. Connect the hard drive and flash storage flex cables to the logic board. Reinstall the two retainer plates and three (3) T6 retainer plate screws.

**Note:** Ensure that the logic board is not pinching the hard drive, IR, and flash storage cables.





9. Reinstall the [fan](#).

10. Reinstall the [wireless card](#) if it was removed.

11. Reinstall the [antenna plate](#).

12. Reinstall the [bottom cover](#).

**If you have installed a replacement logic board:**

13. Use Blank Board Serializer (BBS) to set the computer's serial number after the computer has been reassembled. BBS can be run from AST 1 or AST 2, or as a stand-alone, USB-based version found in article [SD63: Blank Board Serializer](#).

- For more information about AST and supported Mac models, see article [OP476: Latest Apple Service Toolkit download links and documentation](#).
- **Important:** When using BBS in AST 1 or AST 2, ensure that the unit under test (UUT) and the AST server are connected to the same network, and that the AST server has the latest software version installed.

14. Place the removed logic board in an ESD-safe bag and into the proper packaging designated for return to Apple.



# Logic Board Handling

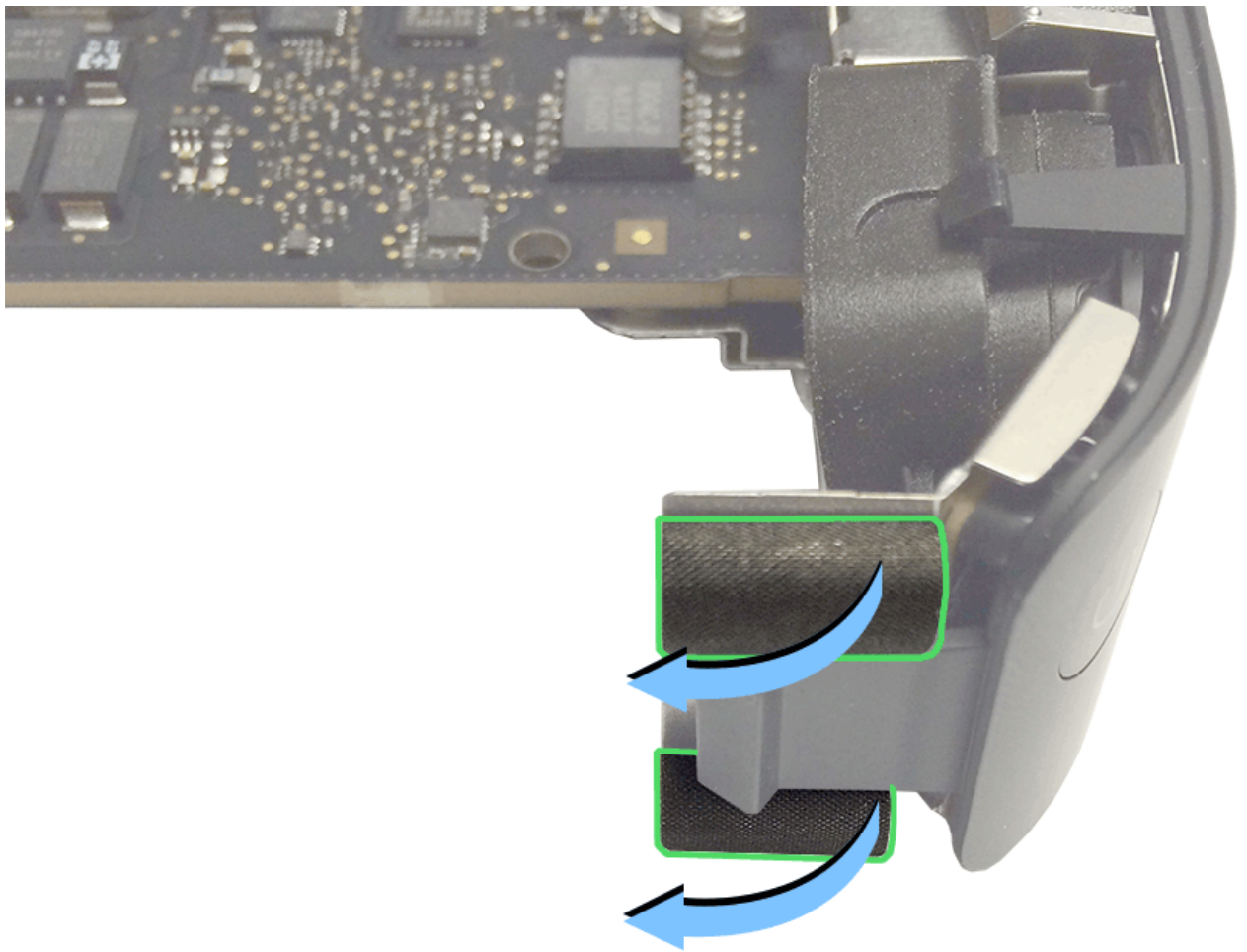
## Logic Board EMI Gaskets

Be careful not to damage the EMI gaskets on the logic board assembly. Check the three (3) EMI foam gaskets on the I/O wall before installing the logic board. Two gaskets are on the side, near the AC sleeve, and the other gasket is along the top of the I/O wall.

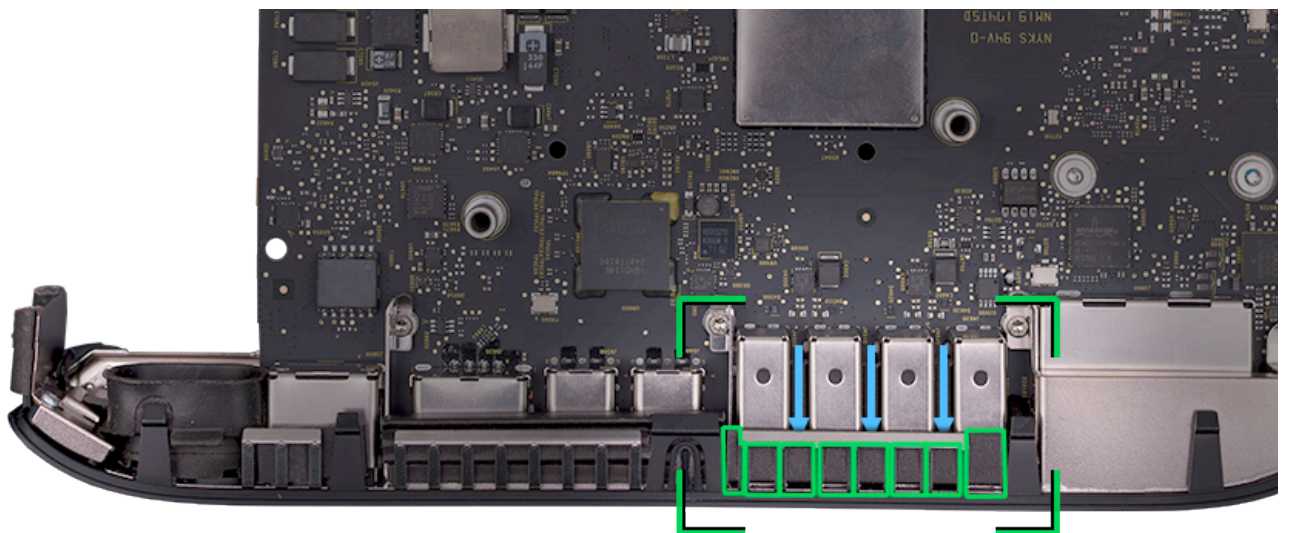
- Inspect two (2) EMI gaskets near the AC sleeve before reinstalling the logic board. Verify that they are not dented or damaged.



- If the EMI gaskets are dented, damaged, or peeling away from the I/O wall, replace the gaskets. Peel the gaskets off the I/O wall and install new gaskets (service part number 923-00322).



- Check that the long EMI gasket is tucked under the EMI fingers. Use a black stick to push the gasket under the EMI fingers if it is out of place. **Note:** This EMI gasket is not glued to the rear housing, so it may move out of place when the logic board is removed.



### Logic Board Return

**Important:** Return the original logic board to Apple in the correct packaging and in the same configuration as the replacement board.

Transfer the following to the replacement board:

- Wireless card and screws
- Speaker and screws
- Battery
- Hard drive (if present)

- Flash storage (if present)

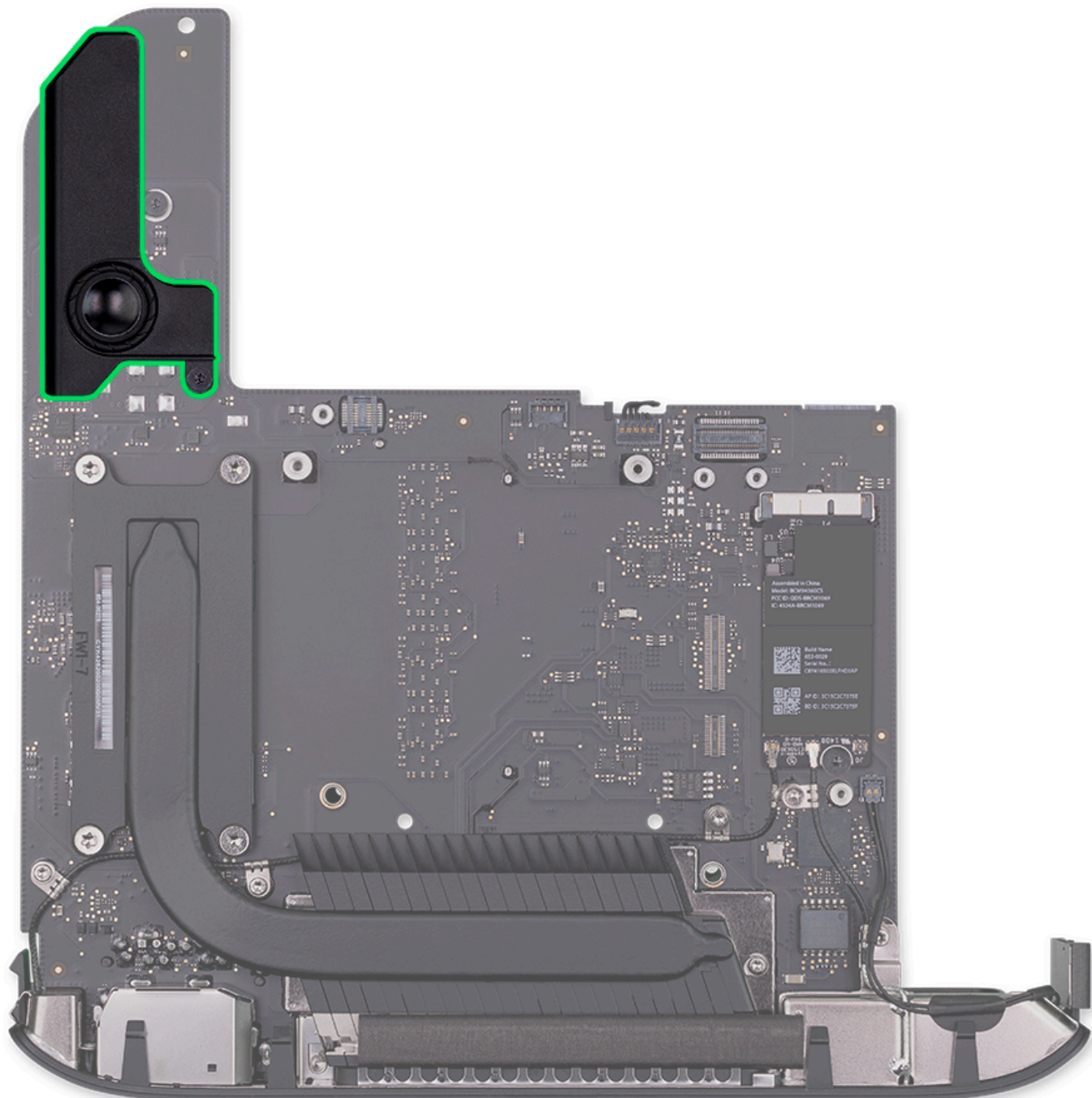


# Speaker

## First Steps

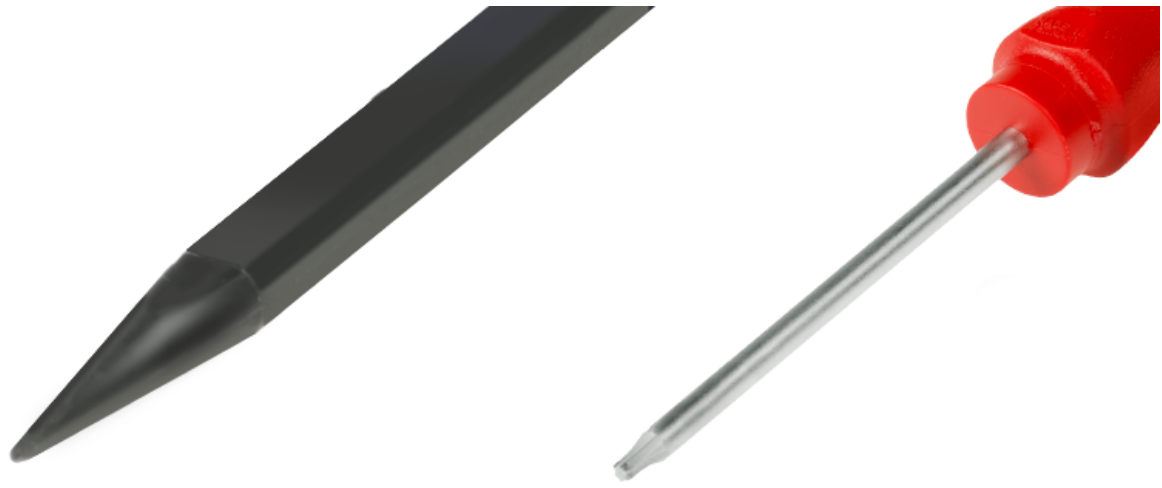
Remove:

- [Bottom cover](#)
- [Antenna plate](#)
- [Logic board](#)



## Tools

- Black stick
- Torx T6 screwdriver (magnetized)



### Steps For Removal

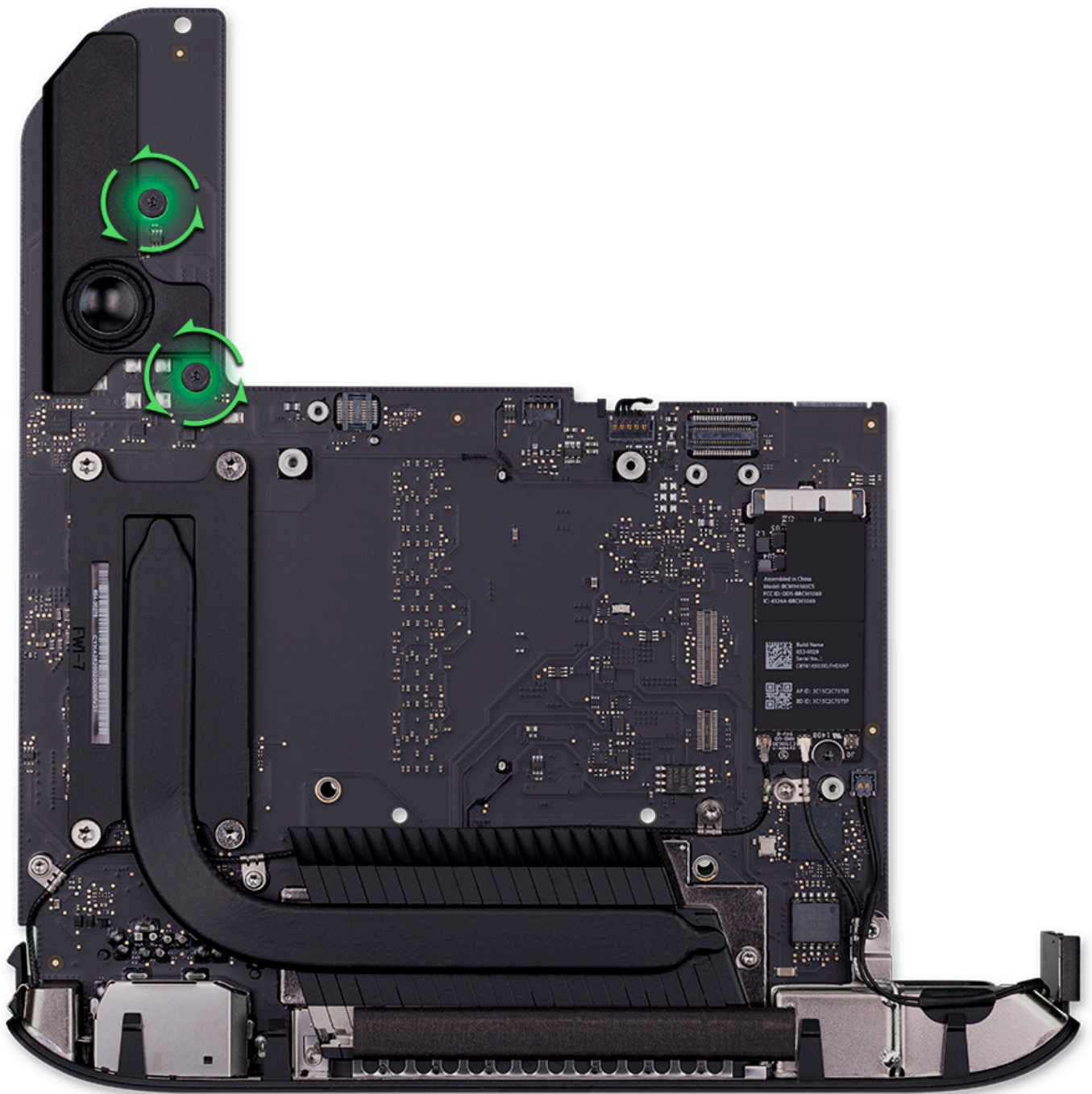
1. Remove two (2) T6 speaker screws.

- One (1) 923-00220 (the upper screw in the image below)



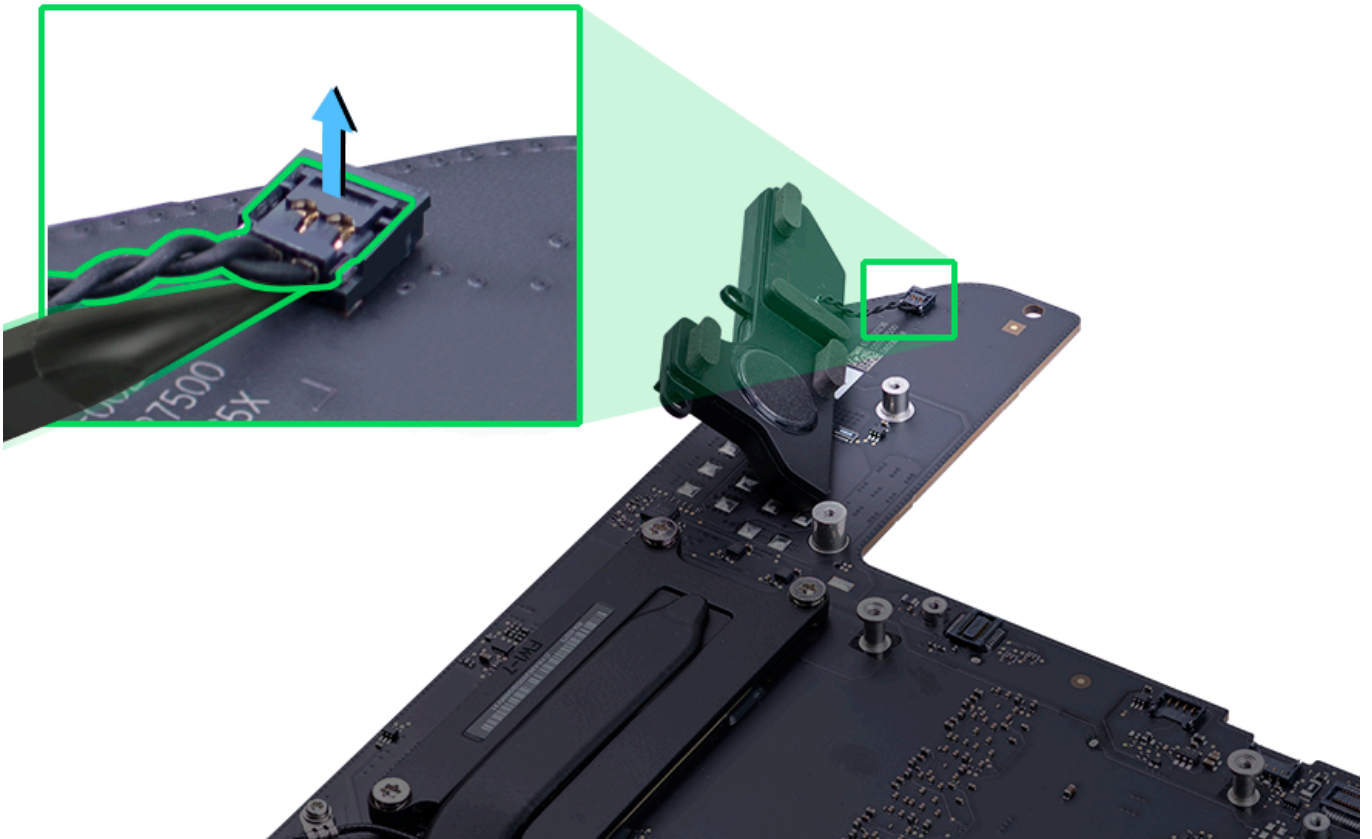
- One (1) 923-00221 (the lower screw in the image below)





2. Carefully lift the speaker to reveal the speaker cable connected to the logic board. Use a black stick to disconnect the cable.

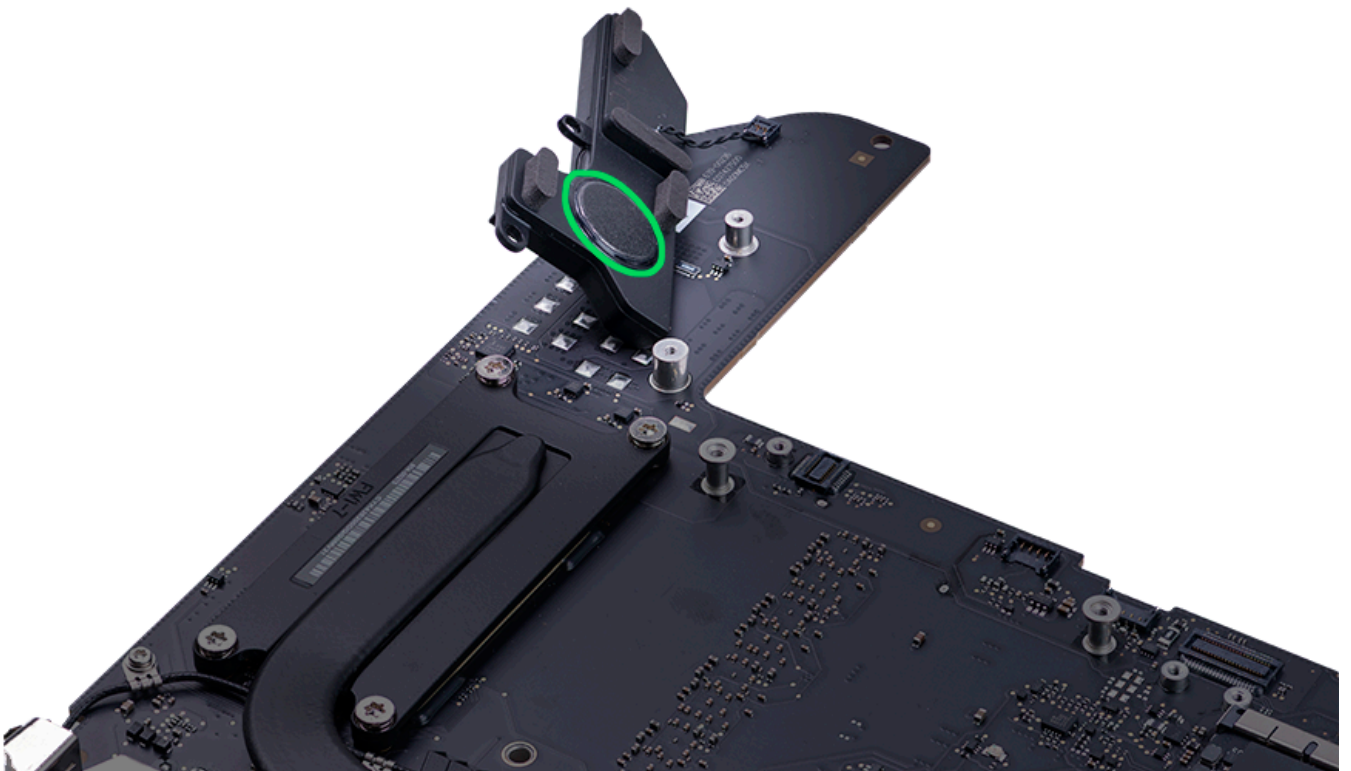




### Steps For Reassembly



1. **Note:** Check the speaker magnet for missing screws before reassembly.





2. Connect the speaker cable to the logic board.

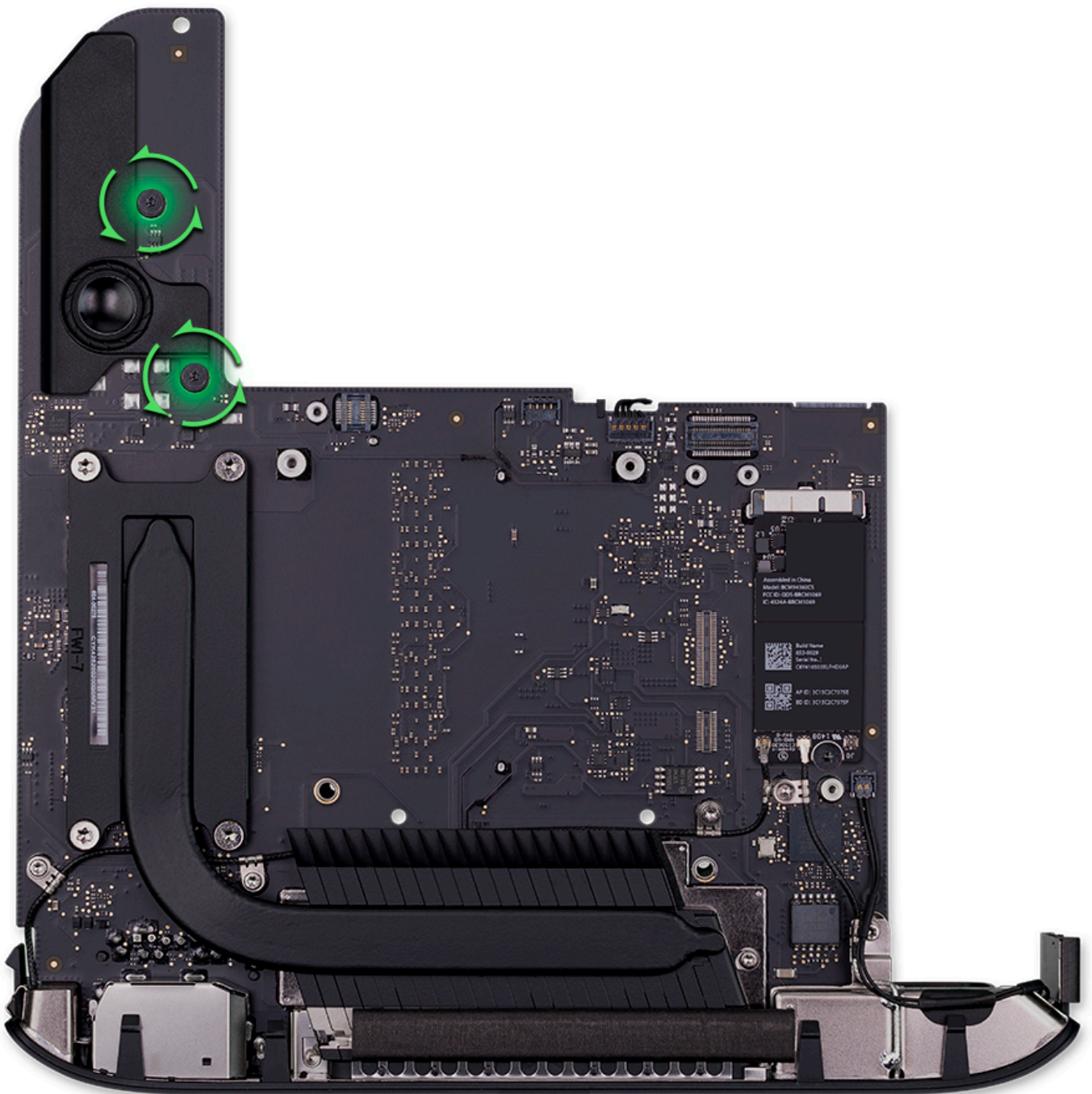
3. Install two (2) T6 speaker screws.

- One (1) 923-00220 (the upper screw in the image below)



- One (1) 923-00221 (the lower screw in the image below)





4. Install the [logic board](#).
5. Install the [antenna plate](#).
6. Install the [bottom cover](#).



# Coin Cell Battery

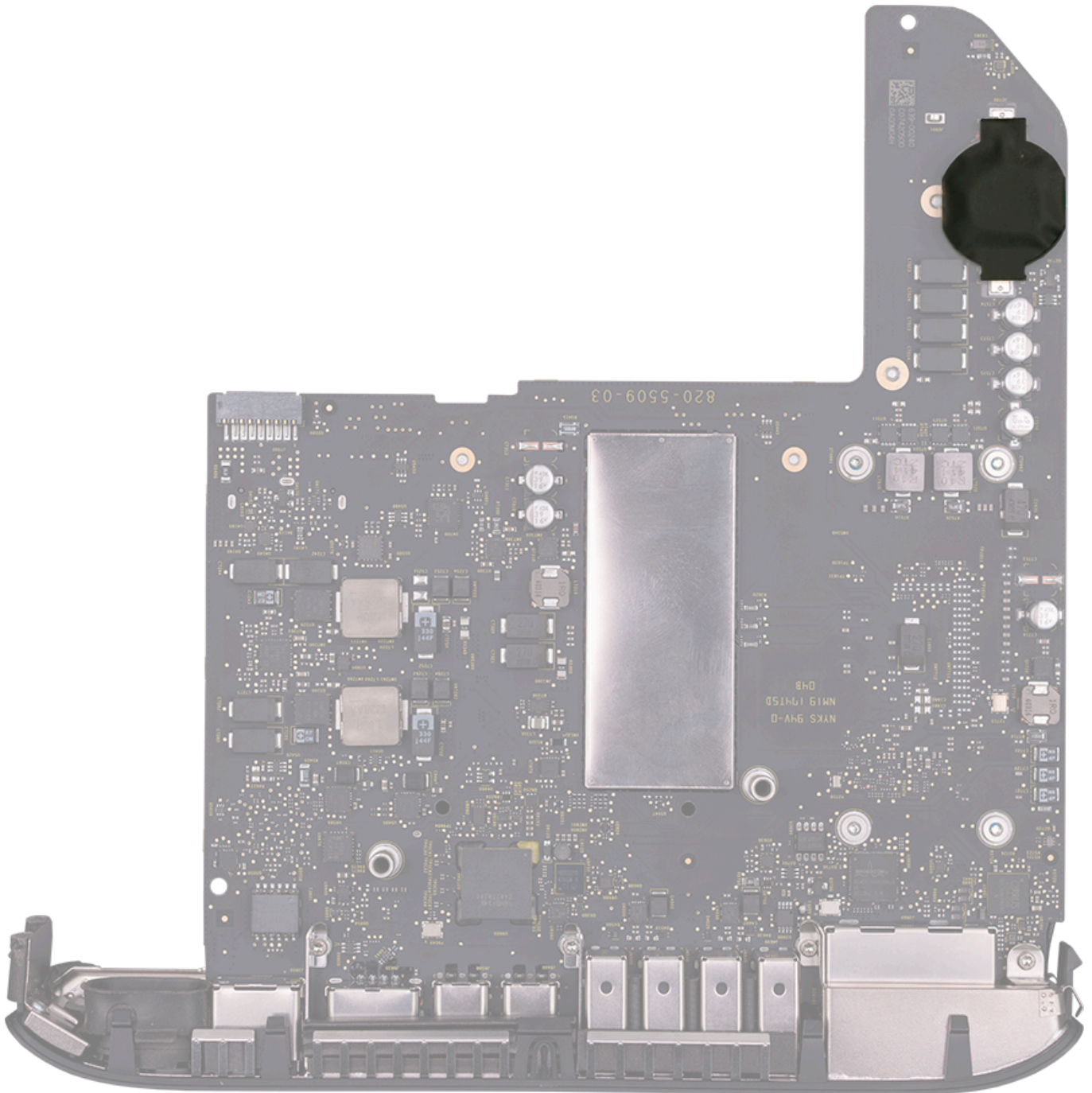
## First Steps

Remove:

- [Bottom cover](#)
- [Antenna plate](#)
- [Fan](#)
- [Logic board](#)

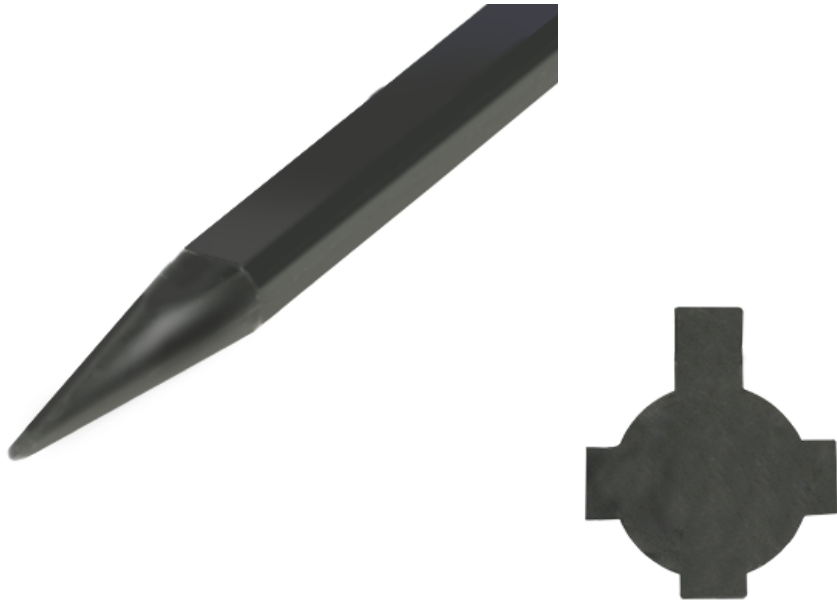


**Warning:** If the battery is installed incorrectly or replaced with an incorrect type of battery, there is a risk of explosion. Dispose of used batteries according to local environmental laws and guidelines.



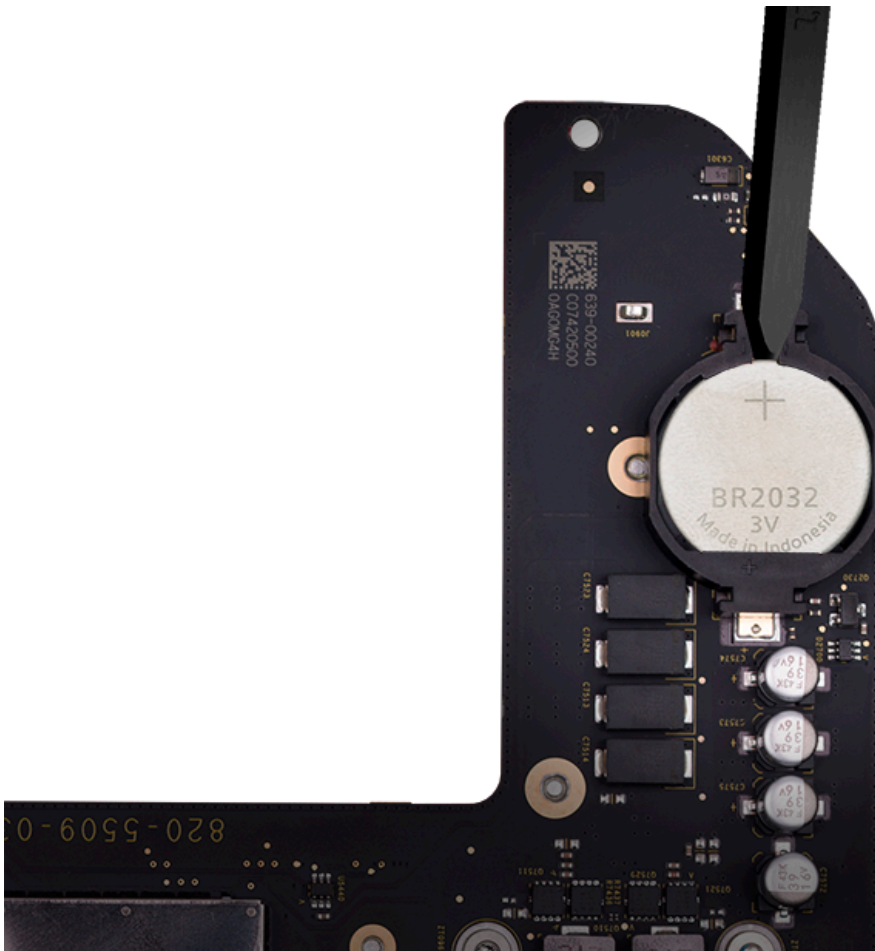
## Tools

- Black stick
- Battery cover tape (923-00216)



## Steps For Removal

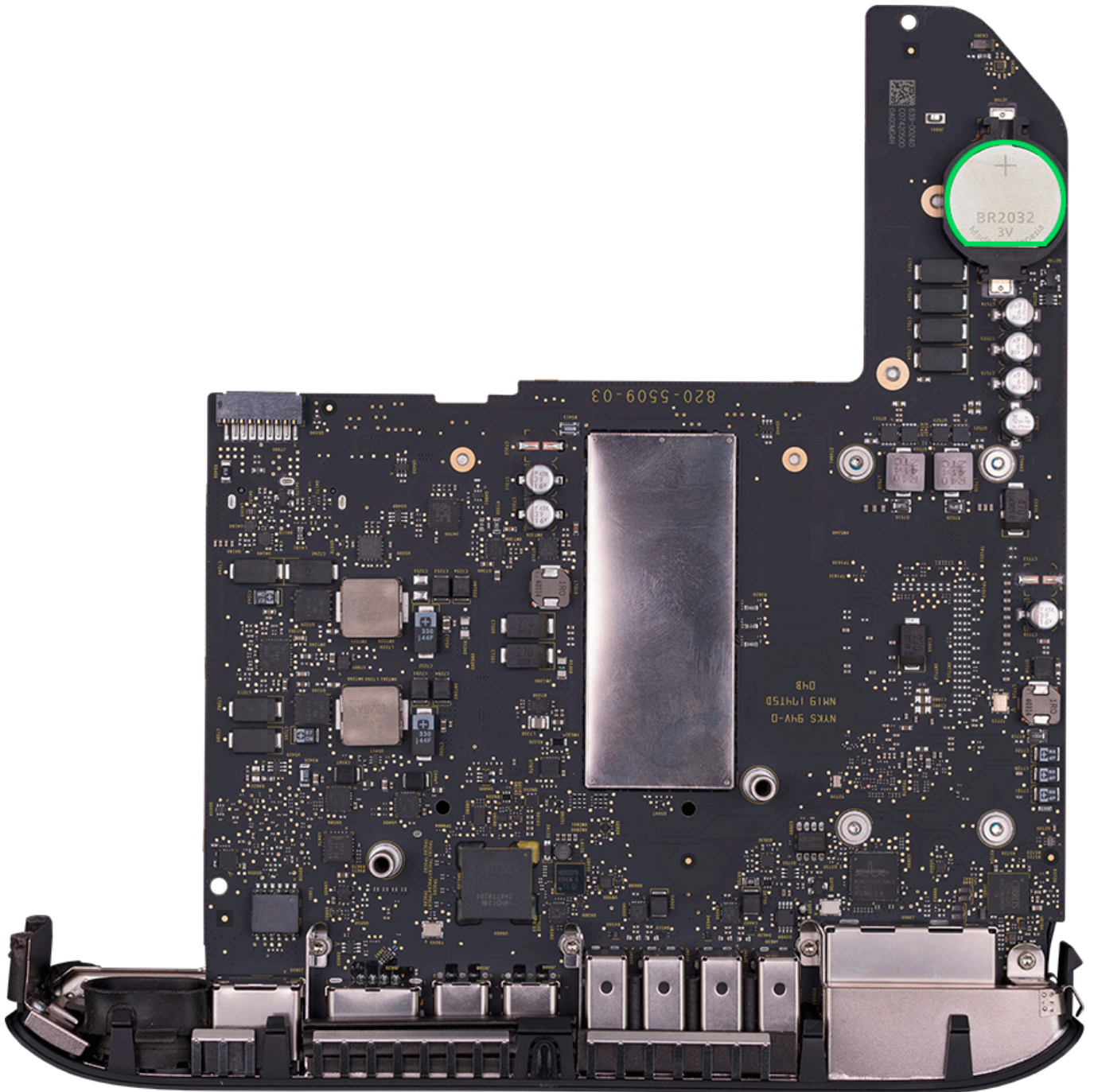
1. Peel off the battery cover tape using a black stick or your fingernail.
2. Insert a black stick into the opening (channel) on the socket and under the battery. Push the battery up and out of the battery socket.
3. Remove any residual glue (on the battery) from the battery cover tape.



## Steps For Reassembly

**Note:** Effective immediately, some coin cell batteries used on Mac systems are now available only from electronics parts distributors (for example, MCM). The coin battery is no longer available to order via GSX. When the Mac repair process indicates the coin battery needs to be replaced, please order it from an electronics parts distributor. **Note:** BR2032 and CR2032 batteries have the same form factor and nominal voltage. However, BR2032 batteries have a lower self-discharge rate and broader operating temperature range than CR2032 batteries for longer shelf and service life.

1. Check that the battery socket is open and free of dust.
2. Slide the battery into the socket with engraved marking (+ side) facing up.



3. Peel the adhesive backing off of the new battery cover tape.



4. Align the longest edge of the tape over the battery socket opening. Adhere all sides of the battery cover tape to the battery socket.
5. Reinstall the [logic board](#).
6. Reinstall the [fan](#).



7. Reinstall the [antenna plate](#).

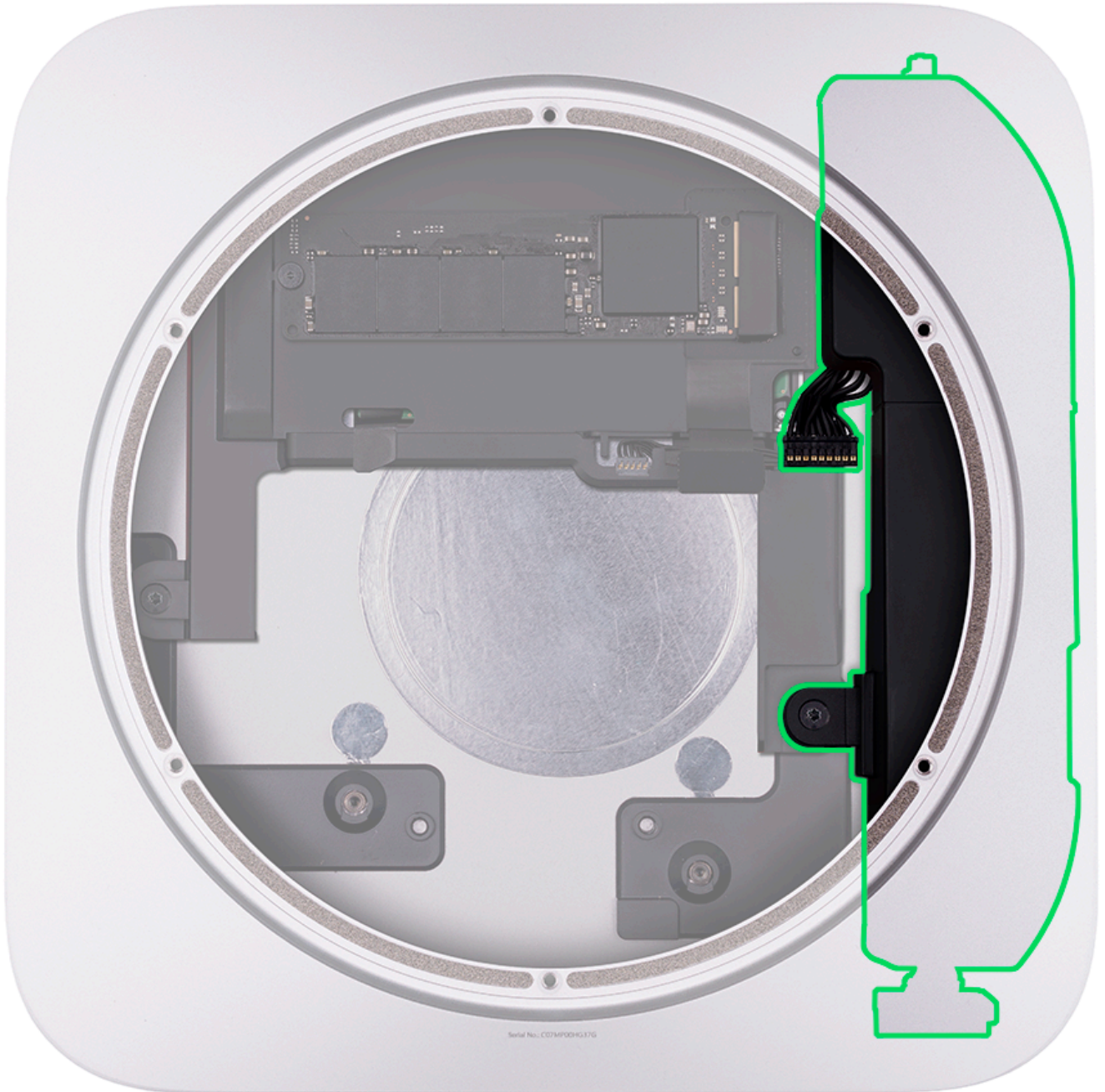
8. Reinstall the [bottom cover](#).

# Power Supply

## First Steps

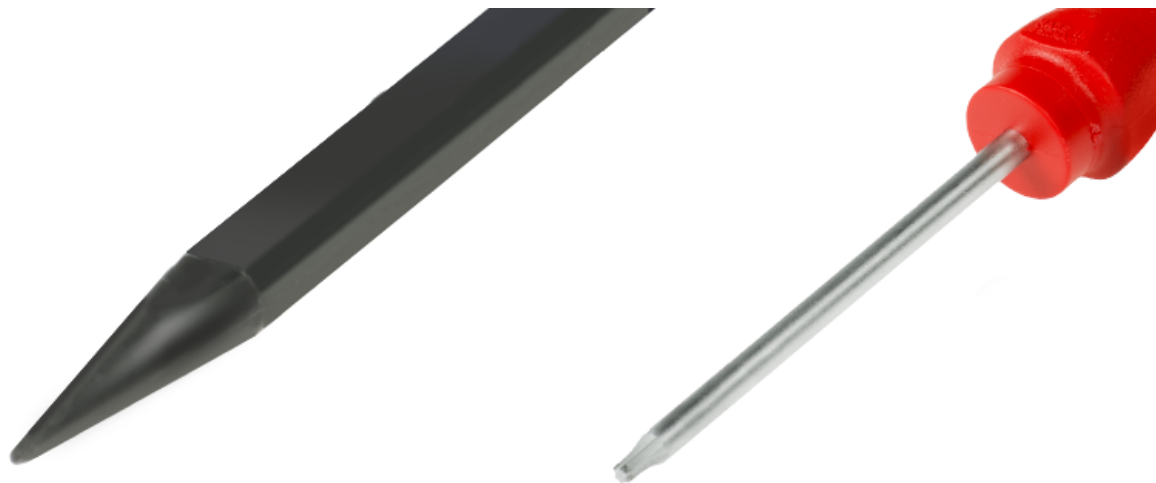
Remove:

- [Bottom cover](#)
- [Antenna plate](#)
- [Fan](#)
- [Logic board](#)



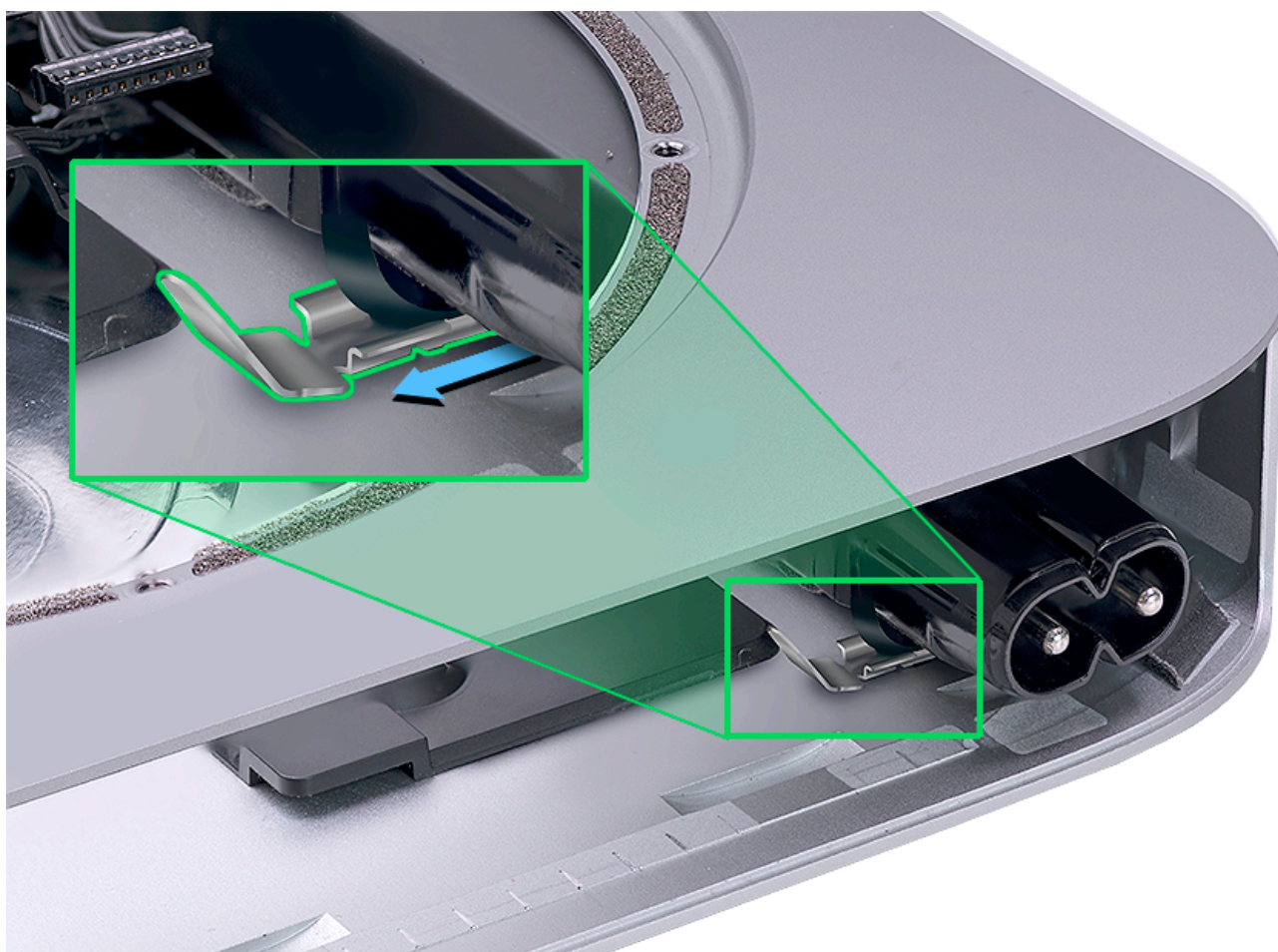
## Tools

- Black stick
- Torx T6 screwdriver (magnetized)
- Power cord (optional)



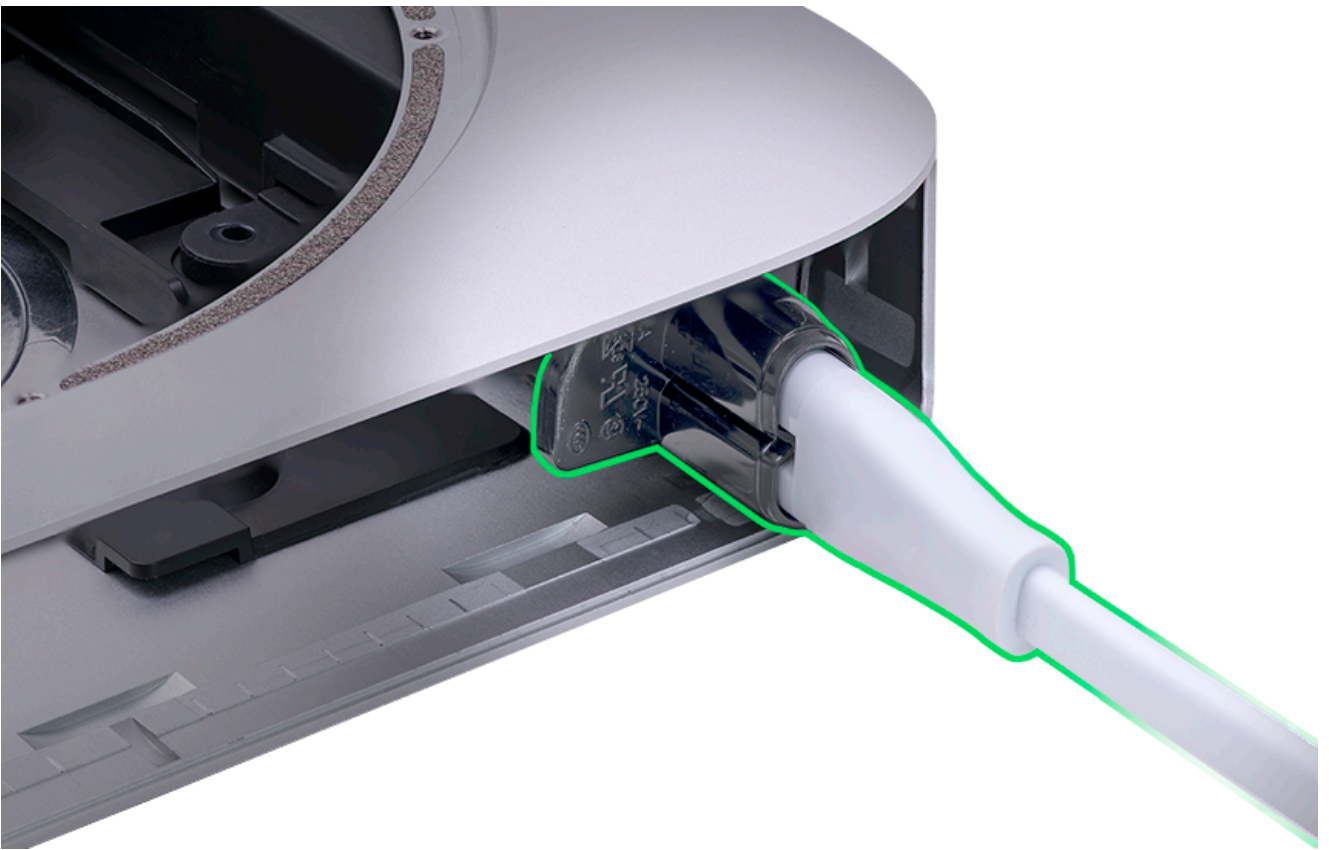
## Steps For Removal

1. Pull the power socket retention clip to the left to release the power cord socket.



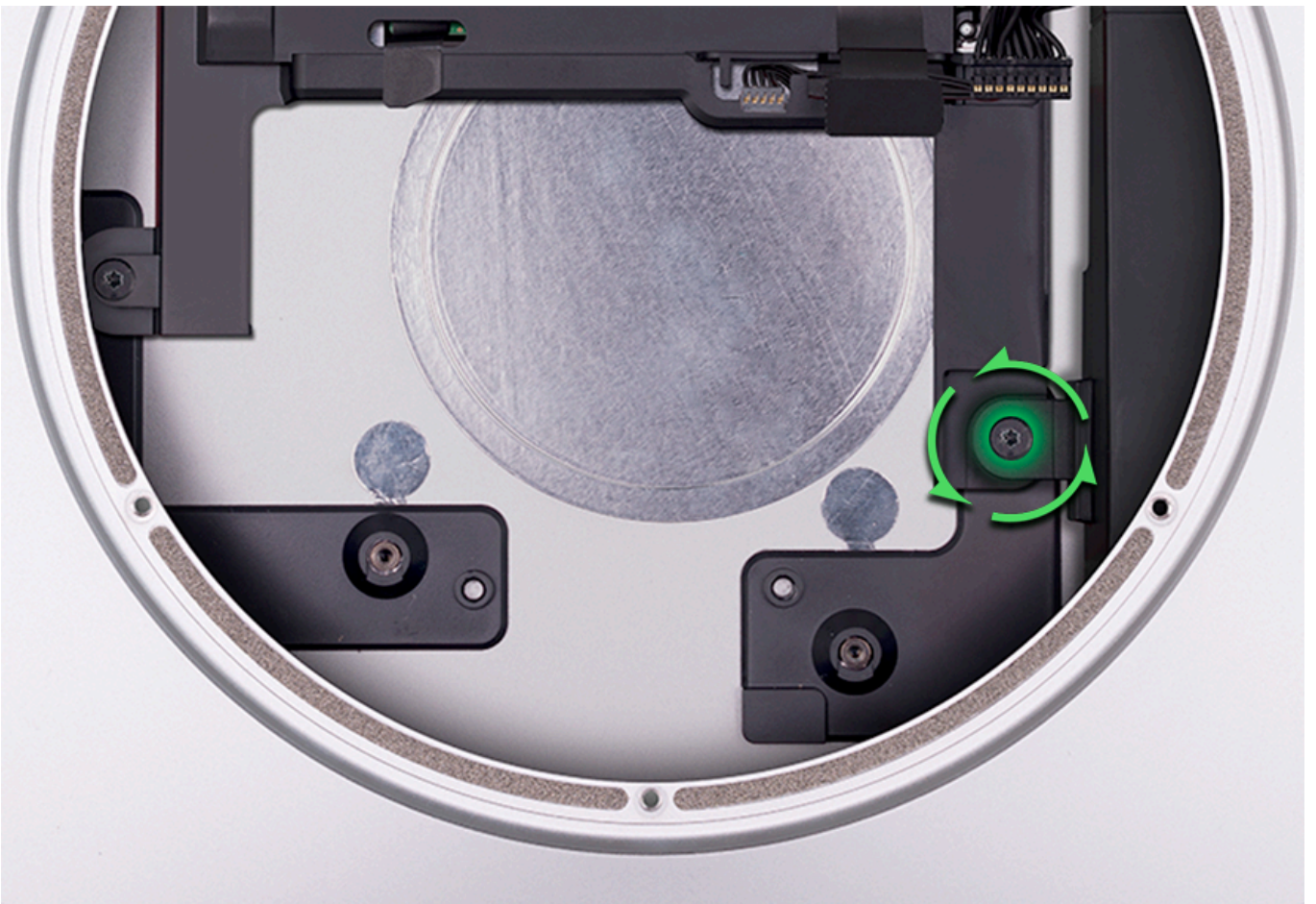
2. Use your fingers or plug in a power cord to rotate the power cord socket 90 degrees counterclockwise (as shown).



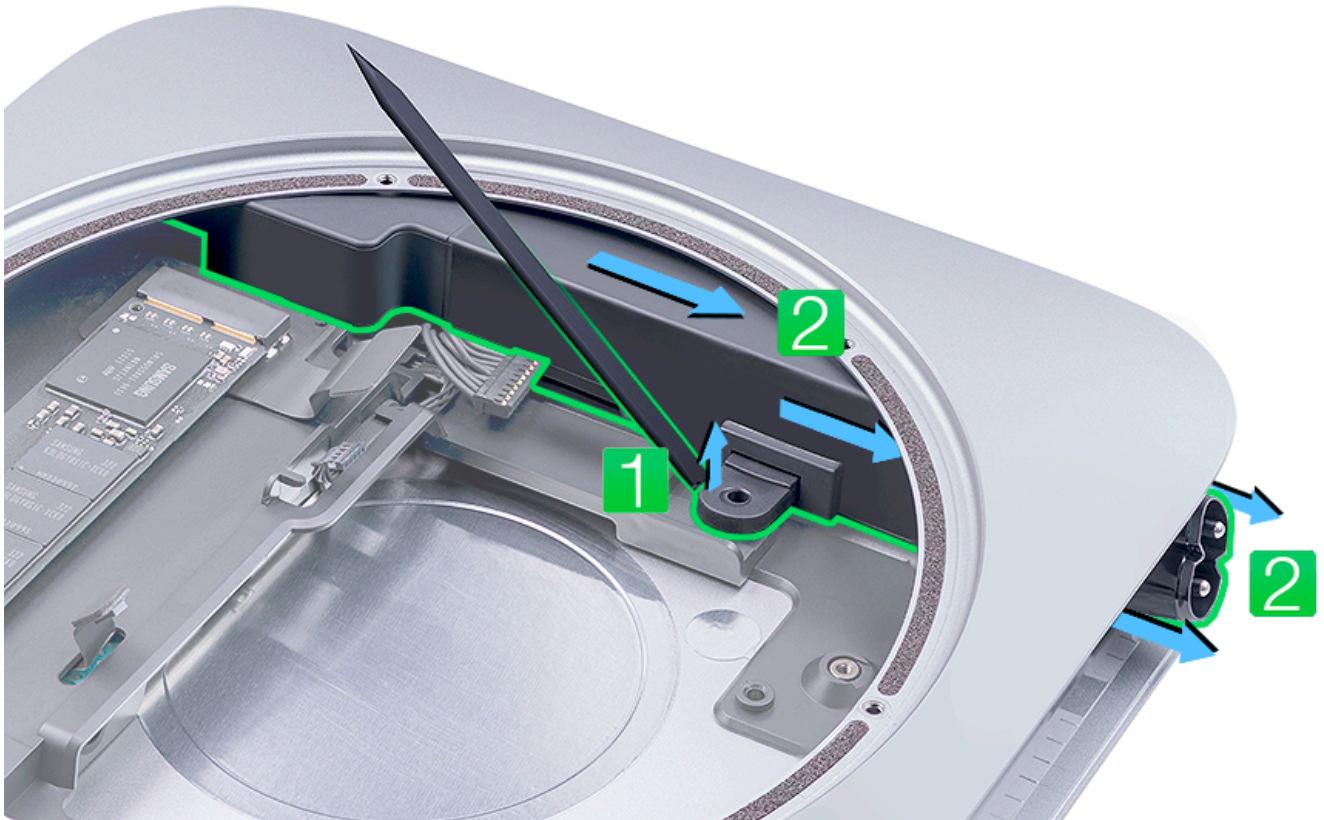


3. Remove one T6 power supply screw.

- 922-9958



4. Use a black stick to lift the screw tab (#1) and slide the power supply assembly (#2) out of the housing. **Replacement Note:** If a replacement power supply will be installed, remove the power supply cable and transfer it to the replacement power supply.



### Steps For Reassembly

1. Connect the power supply cable to the power supply, if it was removed. Orient the cable so the wider connector on the power supply cable connects to the power supply assembly.

**Note:** If a replacement power supply will be installed, transfer the power supply cable to the replacement power supply.



2. Slide the power supply into the housing.

3. Line up the screw tab on the power supply with the screw hole on the housing.

4. Install a new T6 power supply screw each time the power supply is removed. **Note:** Do not reuse the screw.

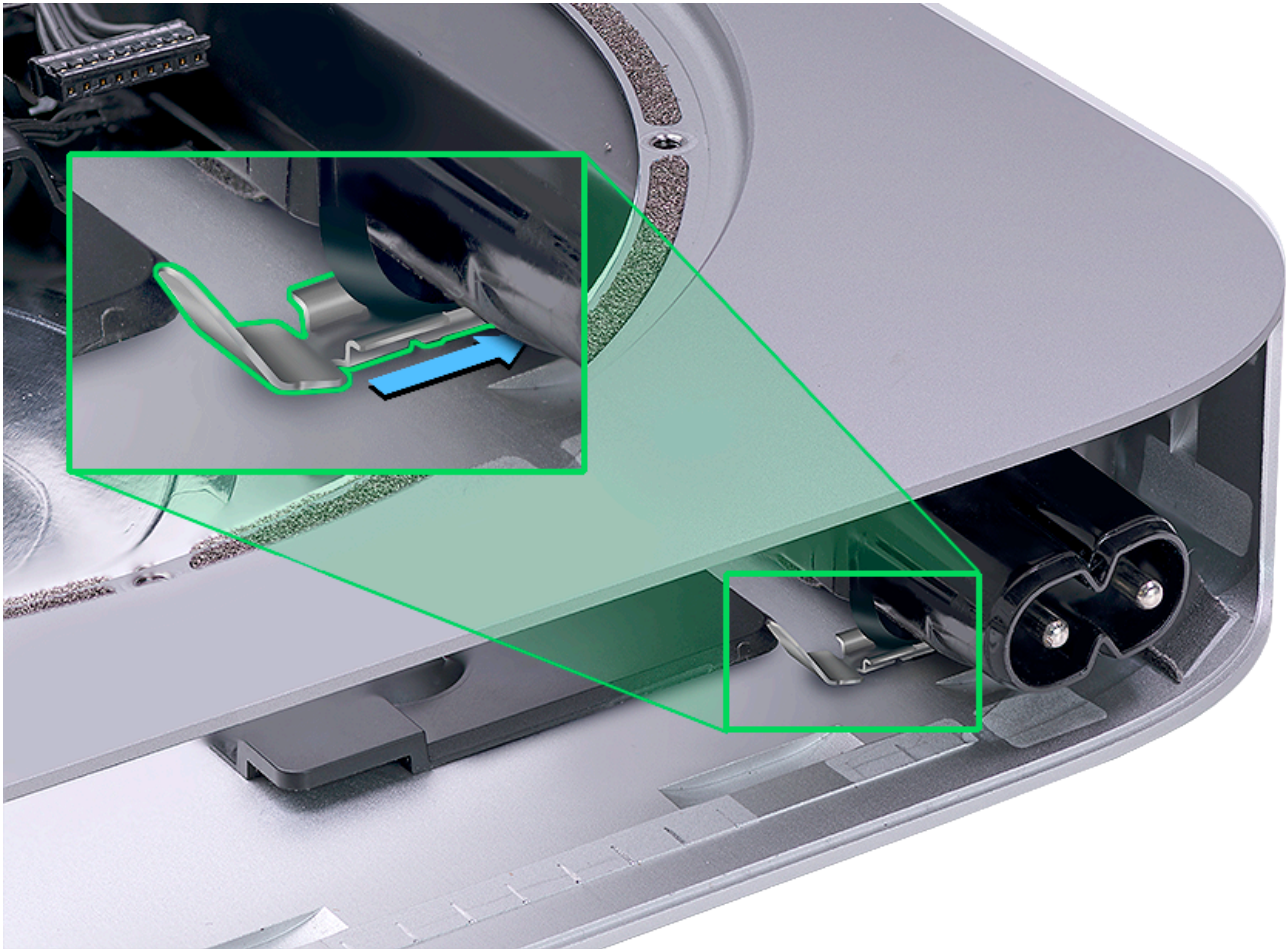
- 922-9958



5. Attach a power cord to the AC power socket and rotate it 90 degrees clockwise. Remove the power cord once the AC socket is aligned in the housing. **Note:** The power cord socket rotates within a groove in the housing and must be aligned correctly before the retention clip can be inserted.

6. Reinstall the power socket retention clip under the AC power socket.

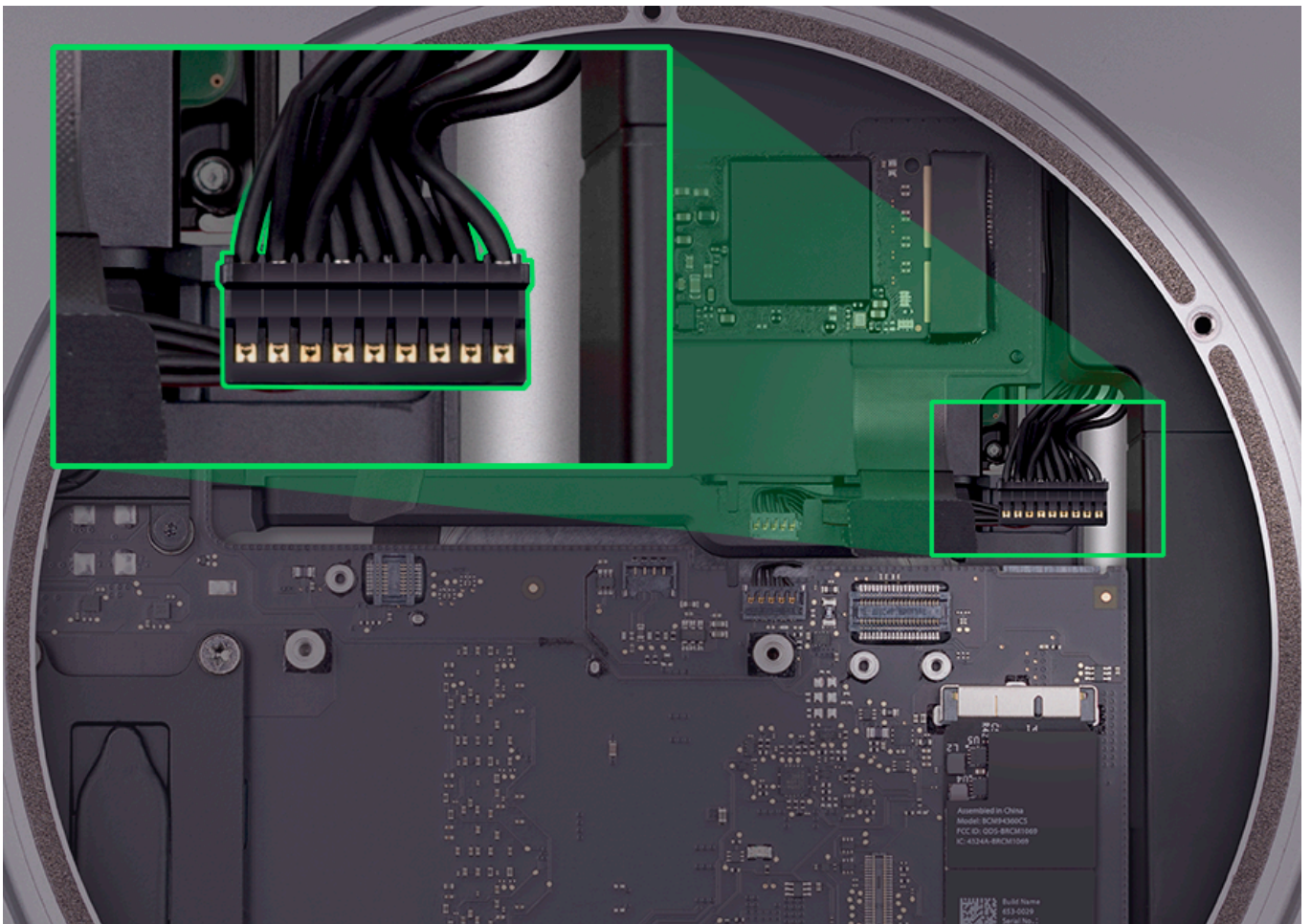




7. Reinstall the [logic board](#).

8. Orient the power supply cable so the gold fingers face up. Connect the power supply cable to the logic board.





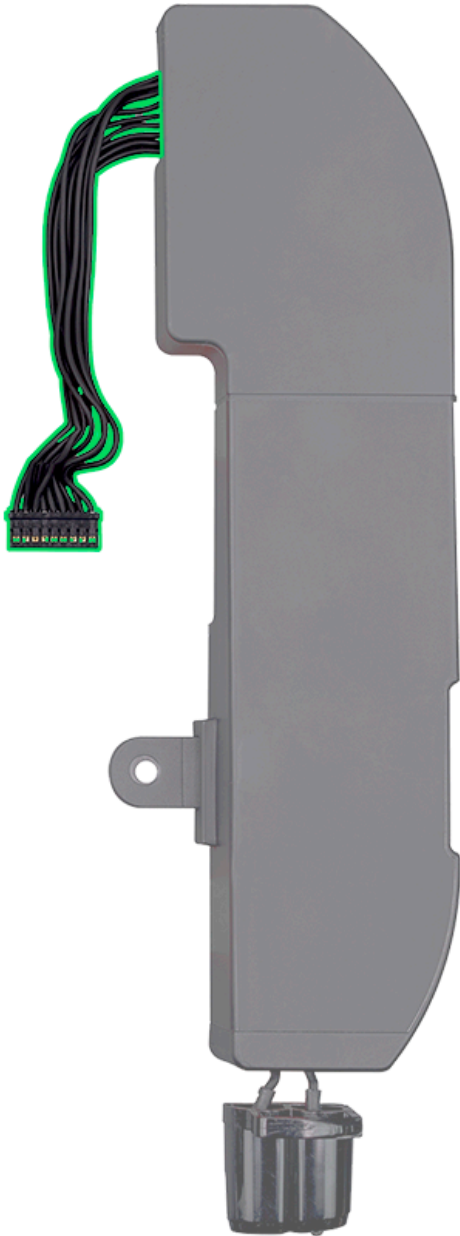
9. Reinstall the [fan](#).
10. Reinstall the [antenna plate](#).
11. Reinstall the [bottom cover](#).

# Power Supply Cable

## First Steps

Remove:

- [Bottom cover](#)
- [Antenna plate](#)
- [Fan](#)
- [Logic board](#)
- [Power supply](#)

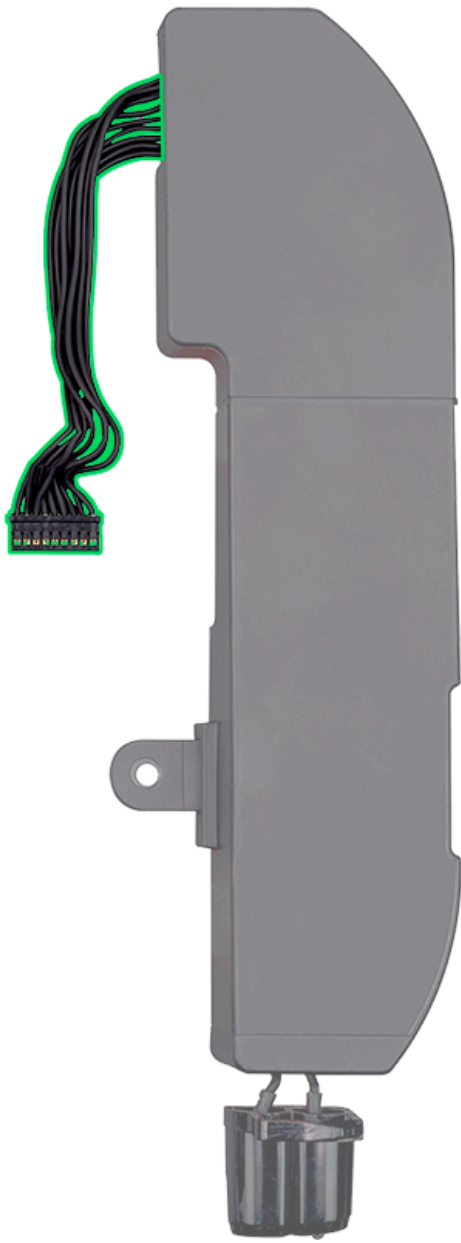


## Tools

- No tools are required for this repair.

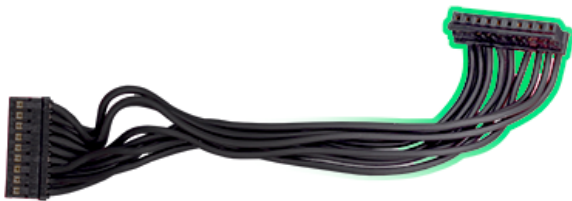
## Steps For Removal

Disconnect the power supply cable from the power supply connector.



## Steps For Reassembly

1. **Note:** If a replacement power supply will be installed, transfer the power supply cable to the replacement power supply. Orient the cable so the wider connector on the power supply cable connects to the power supply assembly.

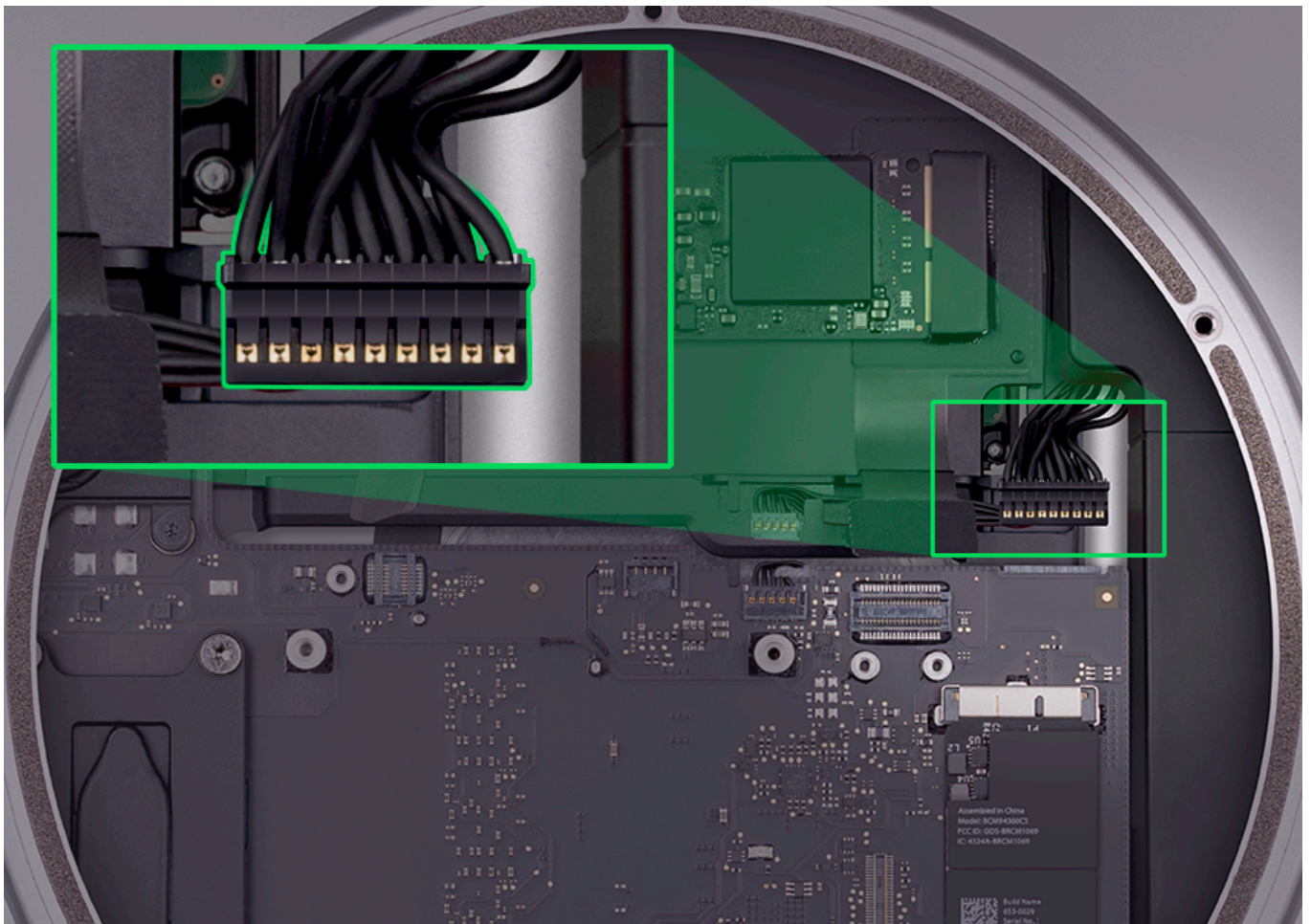


2. Replace the [power supply](#).

3. Replace the [logic board](#).

4. Route the power supply cable along the side of the power supply. Orient the cable so the gold connectors face up, then connect it to the logic board connector.





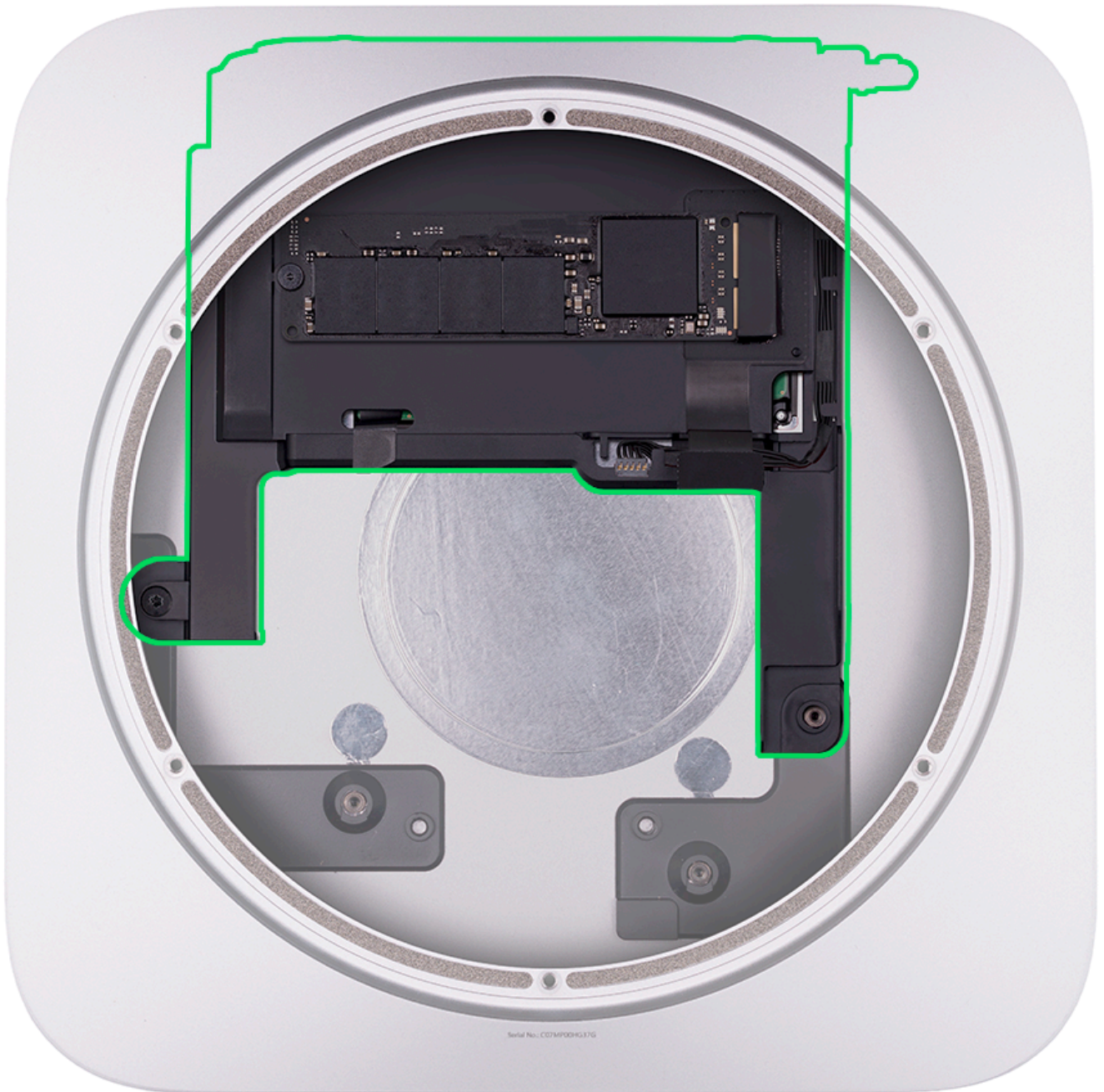
5. Replace the [fan](#).
6. Replace the [antenna plate](#).
7. Replace the [bottom cover](#).

# Hard Drive Carrier

## First Steps

Remove:

- [Bottom cover](#)
- [Antenna plate](#)
- [Fan](#)
- [Logic board](#)
- [Power supply](#)



## Tools

- Torx T6 screwdriver (magnetized)
- Torx T8 screwdriver (magnetized), if removing the hard drive from the hard drive carrier

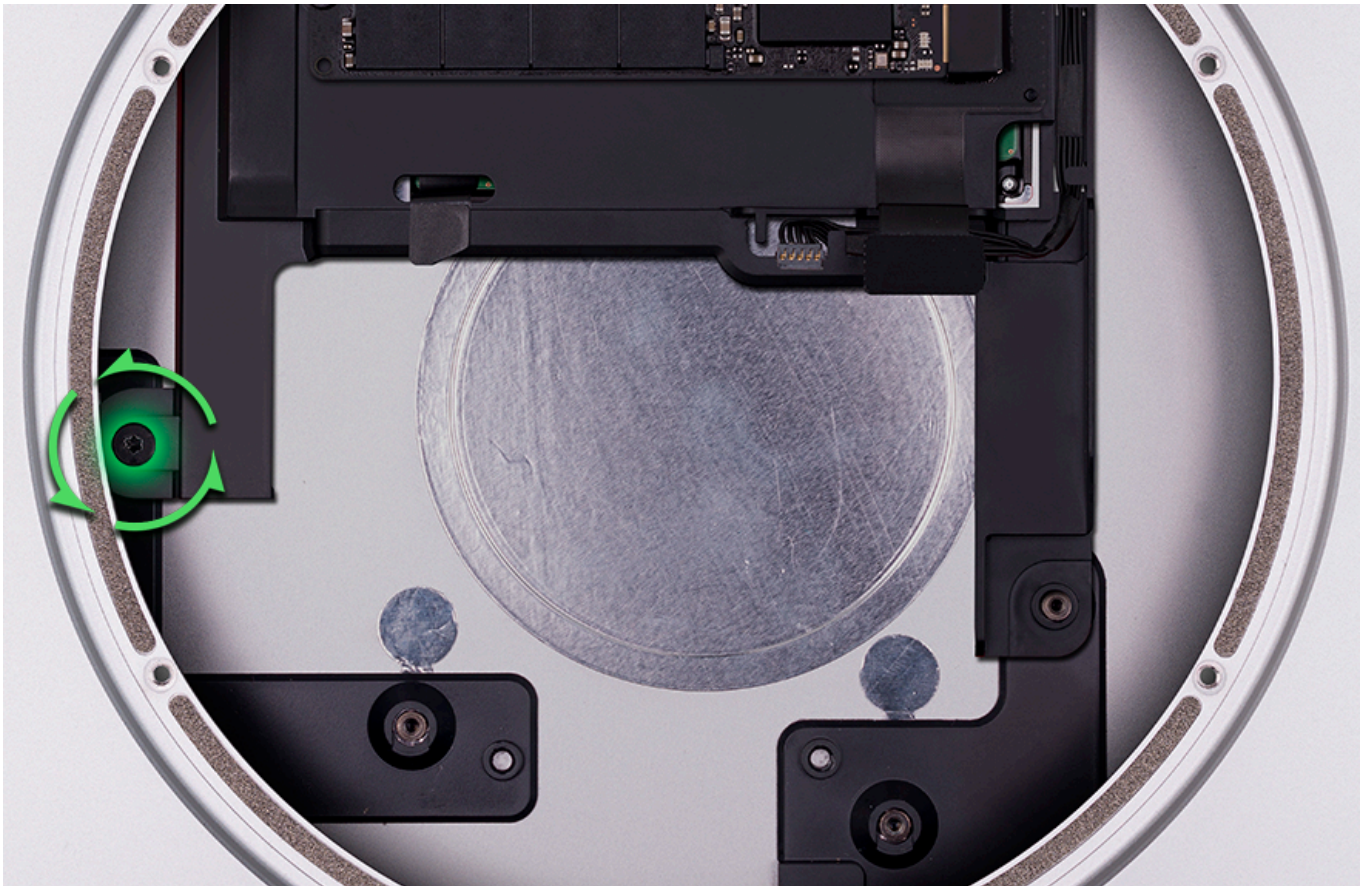




## Steps For Removal

1. Remove one T6 screw from the left side of the carrier.

- 922-9958



2. Pull the carrier forward, toward the I/O ports, and lift the carrier out of the housing.

**Replacement Note:** If replacing the hard drive carrier, transfer the following to the replacement carrier:

- Hard drive
- Hard drive flex cable
- Flash storage card



- IR cable with board and screw

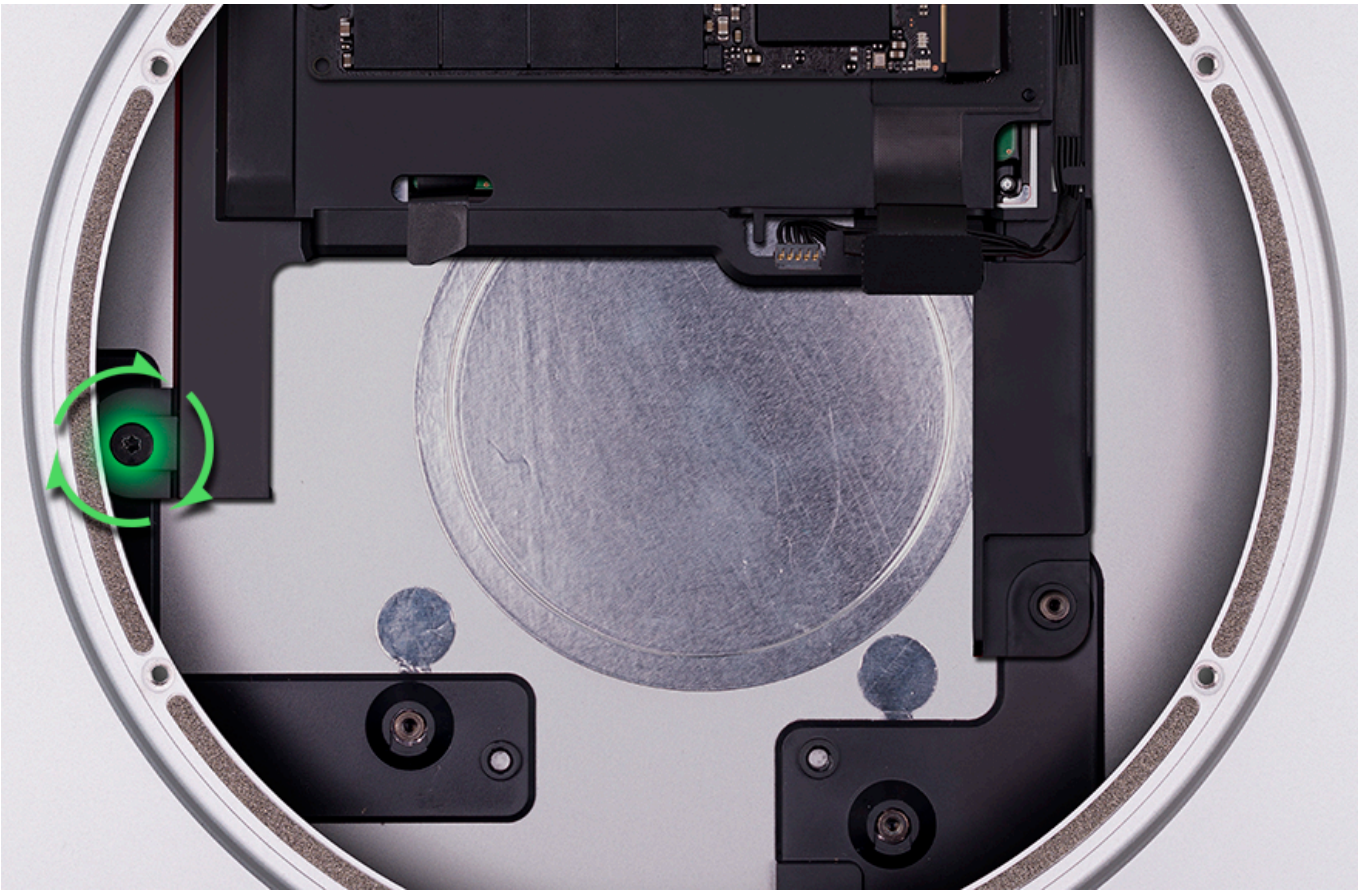


### Steps For Reassembly

1. Install a new T6 hard drive carrier screw each time the screw is removed from the carrier. **Note:** Do not reuse the screw.

- 922-9958





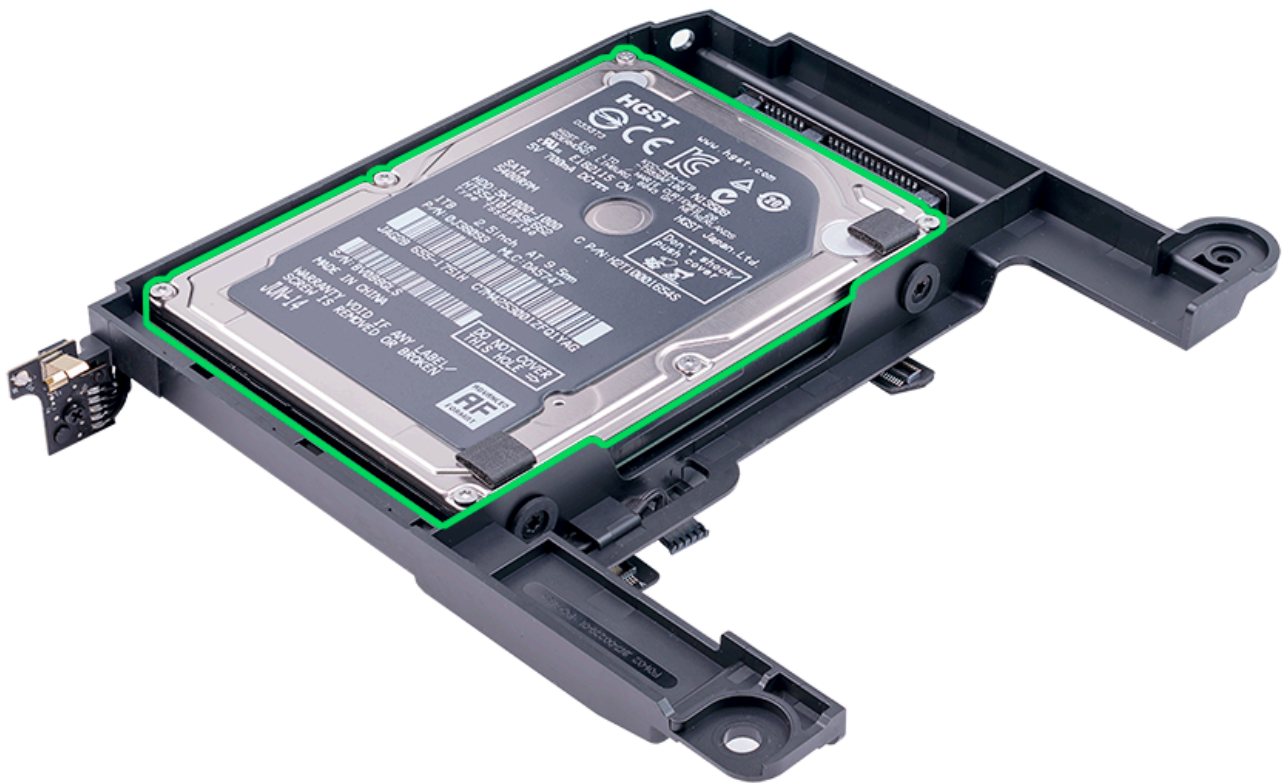
2. Reinstall the [power supply](#).
3. Reinstall the [logic board](#).
4. Reinstall the [fan](#).
5. Reinstall the [antenna plate](#).
6. Reinstall the [bottom cover](#).

# Hard Drive

## First Steps

Remove:

- [Bottom cover](#)
- [Antenna plate](#)
- [Fan](#)
- [Logic board](#)
- [Power supply](#)
- [Hard drive carrier](#)



## Tools

- Torx T8 screwdriver (magnetized)

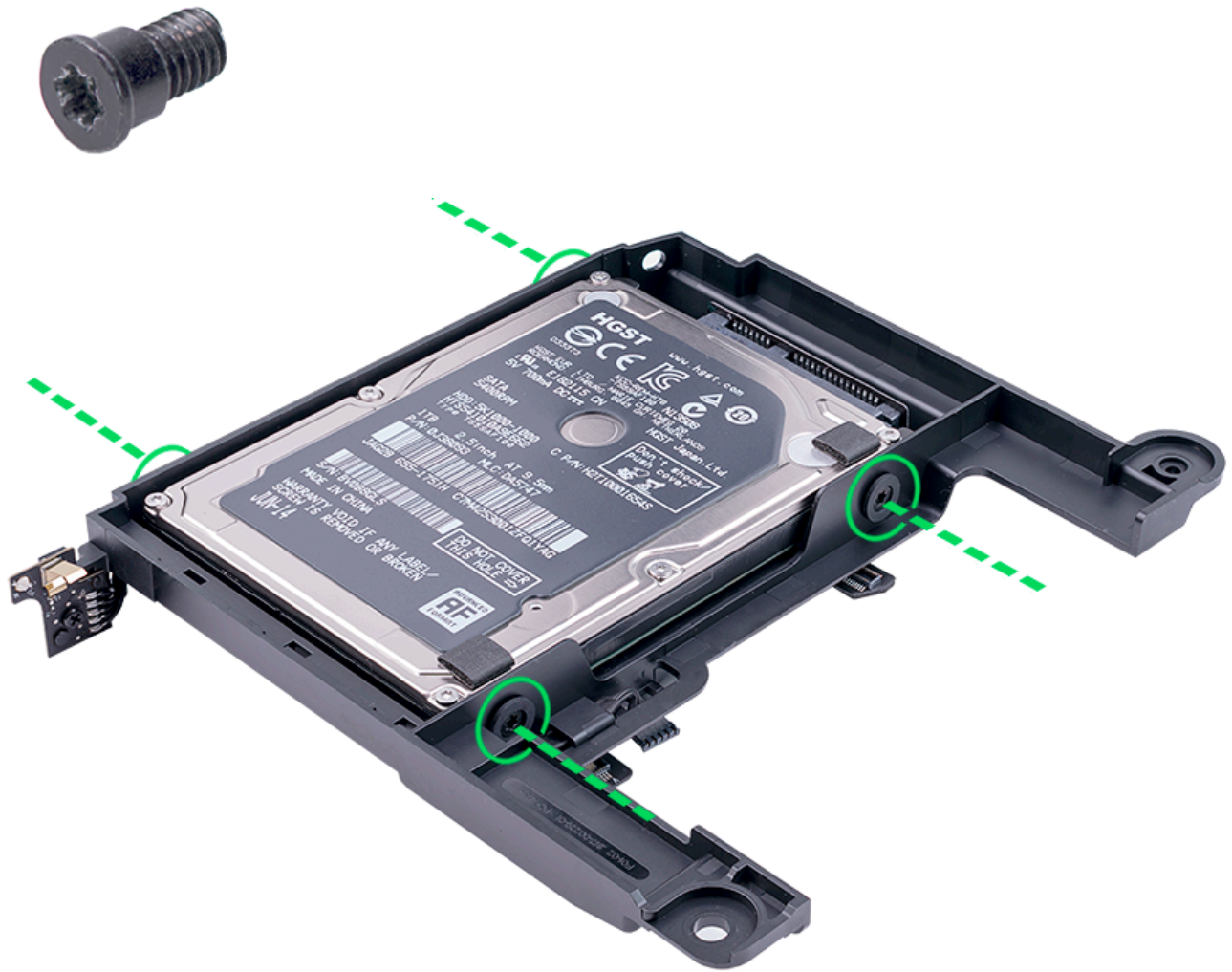


## Steps For Removal



1. Remove the four (4) T8 shoulder screws that secure the hard drive to the hard drive carrier (two screws on each side).  
**Note:** Install new screws with each hard drive replacement; the screws are included with a replacement hard drive.

- 922-9584



2. Carefully maneuver the hard drive and attached hard drive flex cable out of the hard drive carrier.



3. If a replacement hard drive will be installed, transfer the hard drive flex cable to the replacement hard drive. Refer to Apple Support article [RP1207: Hard Drive Flex Cable](#) for more information.



### Steps For Reassembly

1. Slide the hard drive and flex cable into the hard drive carrier.





2. Install four (4) new T8 hard drive screws to secure the hard drive to the hard drive carrier. **Note:** Install new screws with each hard drive replacement; the screws are included with a replacement hard drive.

- 922-9584





# Reinstalling Software That Came with the Computer

## Reinstalling Software That Came with the Computer

This procedure requires an Internet connection.

**Note:** In some situations, a user may have set a firmware password via a feature such as Find My Mac or FileVault. The user must know the firmware password in order to reinstall OS X or macOS. If the user cannot remember the password, then refer to the technician instructions in article [HT203409: If you lost or forgot your firmware password](#).

**Important:** Apple recommends that users back up their data before any software restore procedure. Back up essential files before installing OS X or macOS. Apple is not responsible for any loss of data.

1. Choose Apple menu > Restart, then hold down the Command (⌘) and R keys while the computer restarts.  
**Note:** To force OS X Lion or later, or macOS Sierra, into Internet Recovery, press and hold the Command-Option-R key combination while starting up the computer.
2. If the computer is not connected to the Internet, choose a network from the Wi-Fi menu (in the top-right corner of the screen).
3. Select "Reinstall OS X" (or macOS), then click Continue.
4. Follow the onscreen instructions. In the pane where you select a disk, select your current OS X or macOS disk (in most cases, it is the only one available).
5. To start the installation, click Install.

Check for and apply the latest software and firmware updates.

For more information, refer to article [HT201314: About macOS Recovery](#).

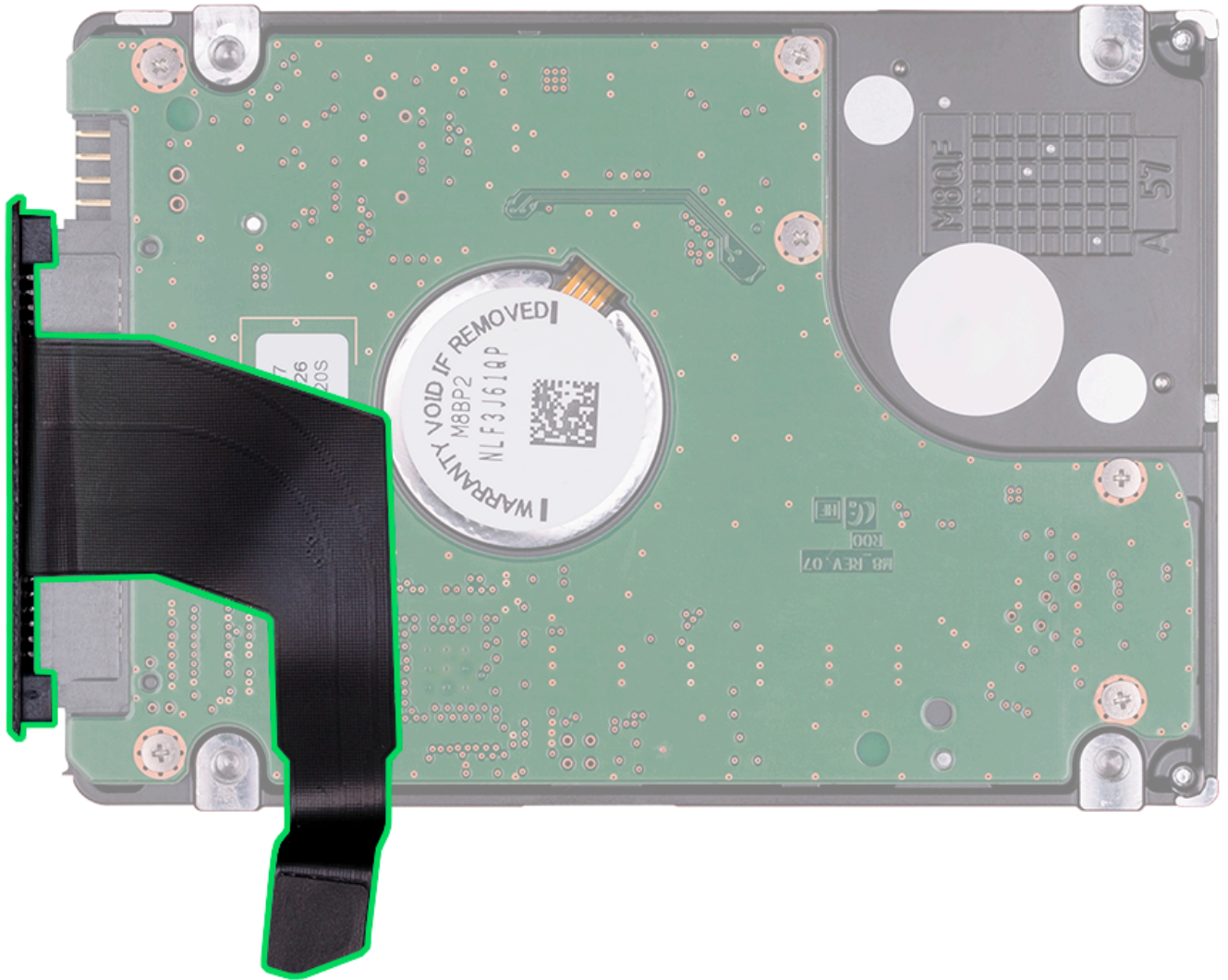


# Hard Drive Flex Cable

## First Steps

Remove:

- [Bottom cover](#)
- [Antenna plate](#)
- [Fan](#)
- [Logic board](#)
- [Power supply](#)
- [Hard drive carrier](#)
- [Hard drive](#)



## Tools

- Black stick



## Steps For Removal

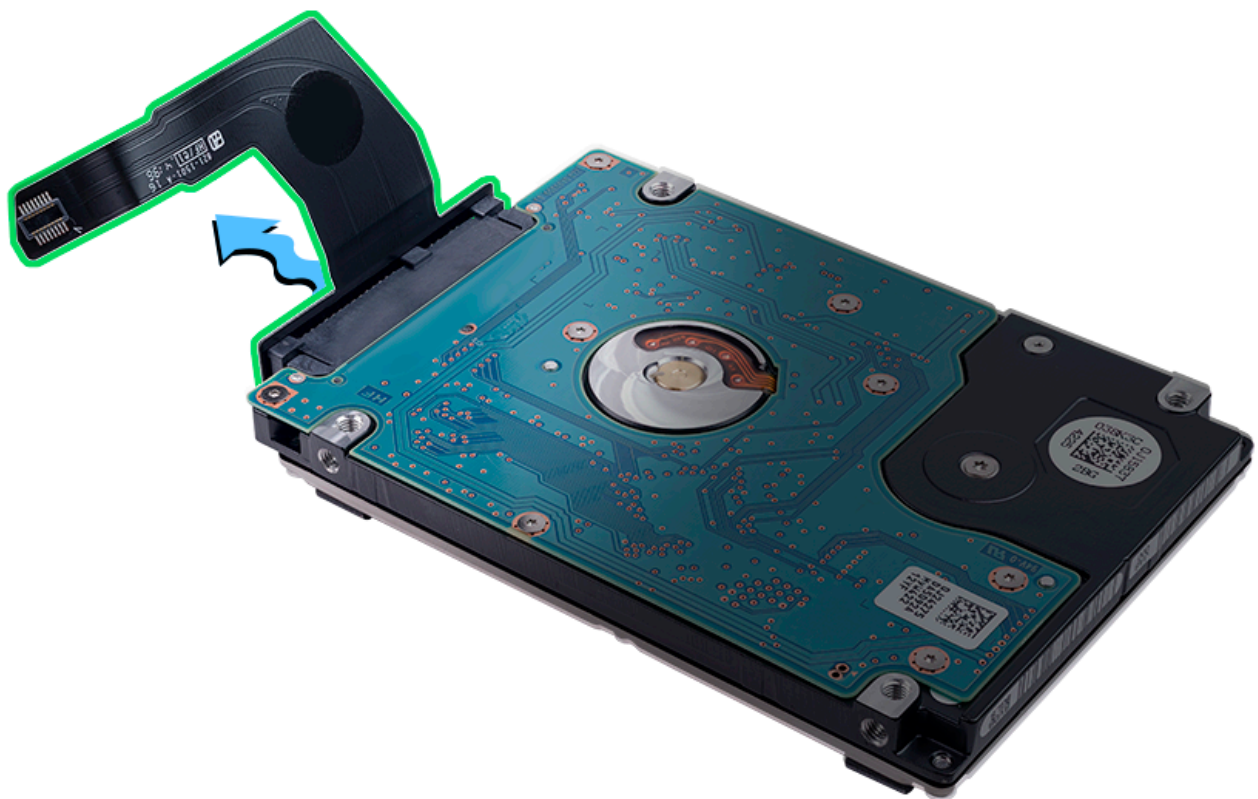
1. Use your fingernail or a black stick to carefully pry the flexible cable up and over, providing access to the piece of black tape underneath.



2. Use your fingernail or a black stick to carefully remove the black tape that secures the hard drive flex cable to the hard drive connector.



3. Use your fingernail or a black stick to carefully remove the hard drive flex cable from the hard drive.



### Steps For Reassembly

1. Connect the hard drive flex cable to the connector on the hard drive.
2. Replace the piece of black tape that secures the connector to the hard drive.
3. If you are installing a replacement hard drive flex cable, first peel the adhesive backing off the flex cable, then press the



flex cable onto the hard drive.



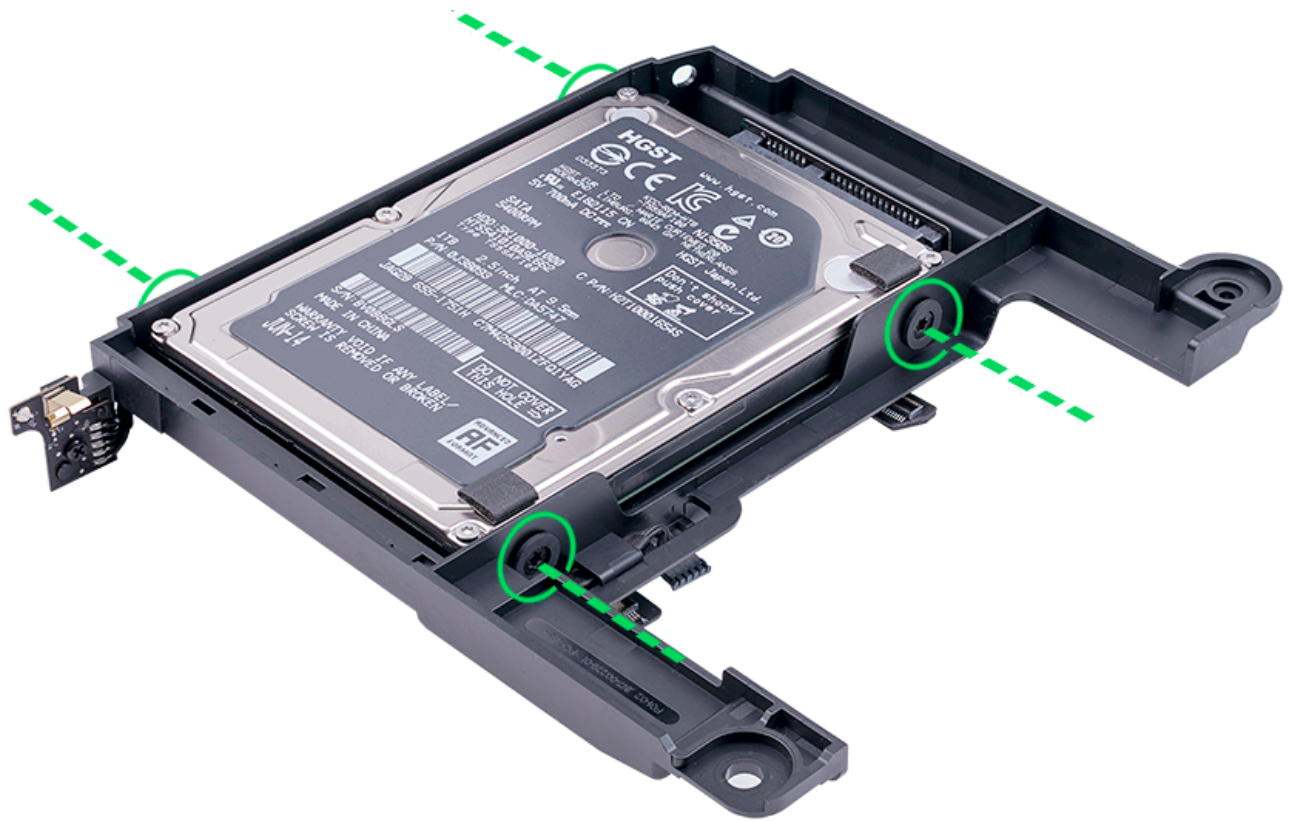
4. Install the hard drive with the flex cable into the hard drive carrier. Gently maneuver the hard drive flex cable through the opening in the hard drive carrier.



5. Reinstall the four (4) T8 hard drive mounting screws.

- 923-0294





6. Check that the hard drive flex cable is sticking out of the hard drive carrier before installing the carrier in the housing.



7. Reinstall the [hard drive carrier](#).
8. Reinstall the [power supply](#).
9. Reinstall the [logic board](#).
10. Reinstall the [fan](#).
11. Reinstall the [antenna plate](#).
12. Reinstall the [bottom cover](#).



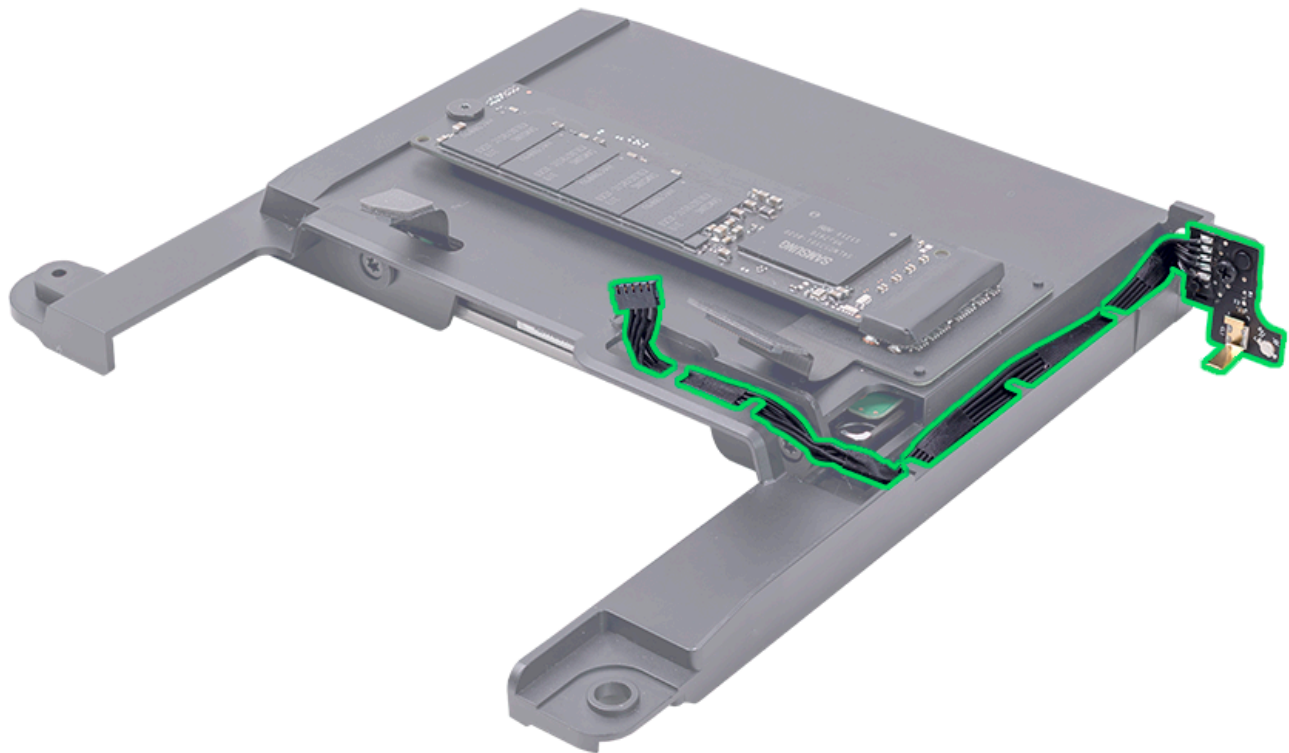


# Infrared (IR) Board and Cable

## First Steps

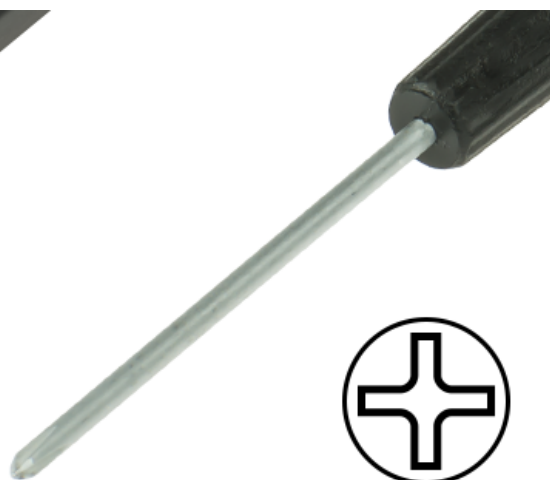
Remove:

- [Bottom cover](#)
- [Antenna plate](#)
- [Fan](#)
- [Logic board](#)
- [Power supply](#)
- [Hard drive carrier](#)



## Tools

- Black stick
- Phillips #0 screwdriver (magnetized)



#0

## Steps For Removal

1. Remove one (1) Phillips #0 screw.

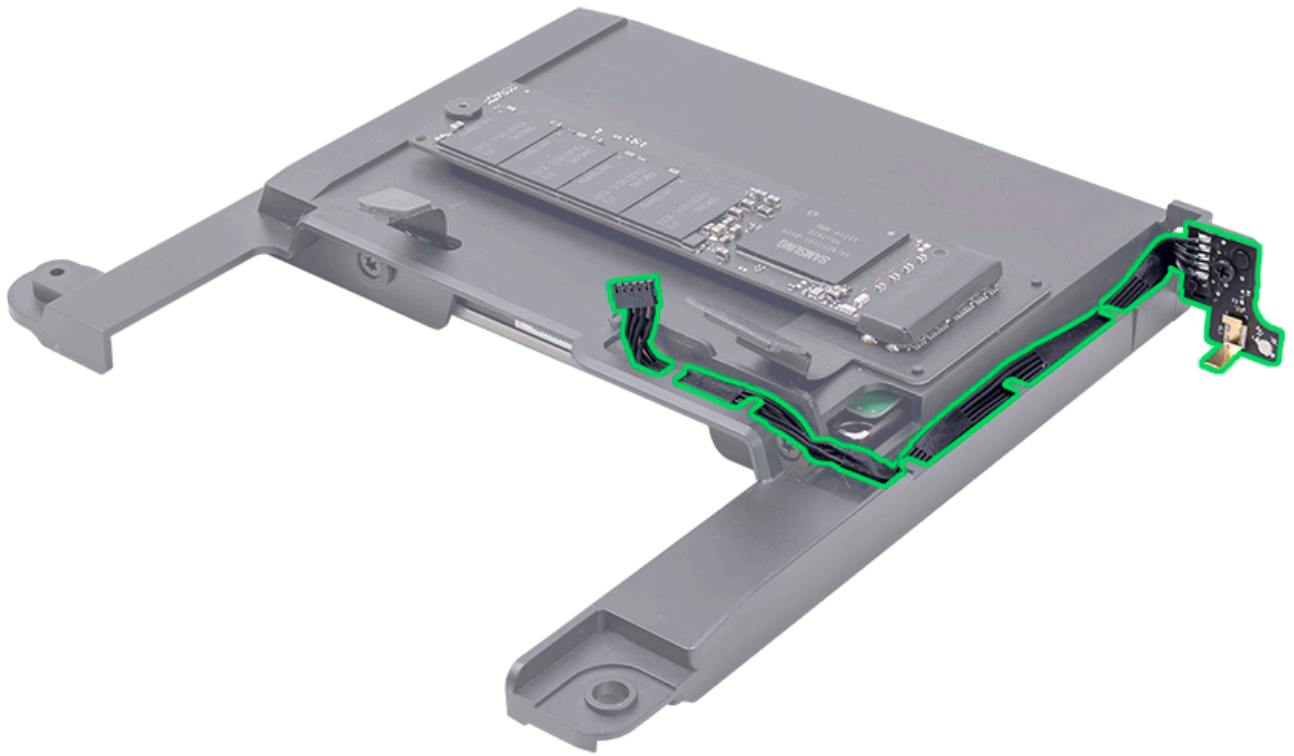
- 922-8820



2. Note the IR cable routing on the drive carrier before removing the part.

3. Remove the IR cable from the cable channel on the hard drive carrier.



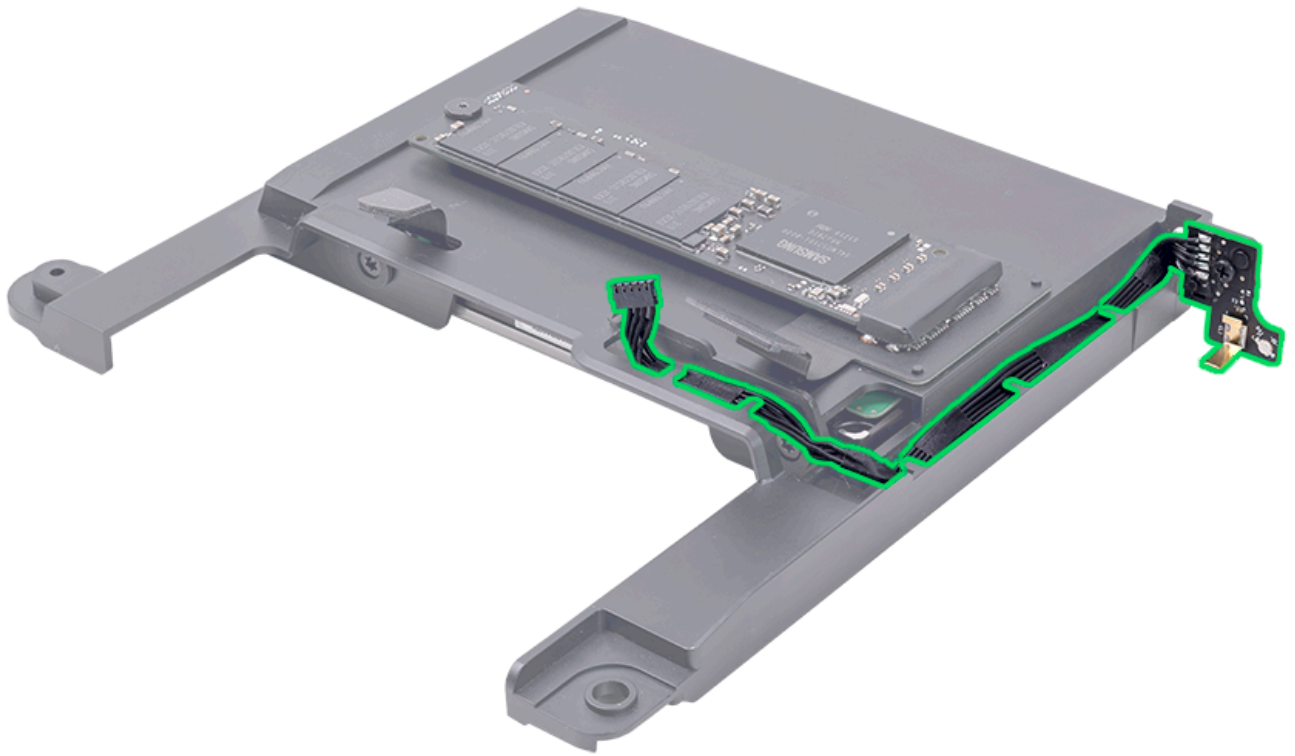


### Steps For Reassembly

1. Position the IR board over the two alignment pins (circled) on the drive carrier and reinstall one IR screw. **Important:** Ensure that the grounding clip has not been damaged and that it will make contact with the Mac mini housing.



2. Insert the IR cable into the cable channel and under the securing tabs, as shown.



3. Reinstall the [hard drive carrier](#).
4. Reinstall the [power supply](#).
5. Reinstall the [logic board](#).
6. Reinstall the [fan](#).
7. Reinstall the [antenna plate](#).
8. Reinstall the [bottom cover](#).

# Housing

## First Steps

Remove:

- [Bottom cover](#)
- [Antenna plate](#)
- [Fan](#)
- [Logic board](#)
- [Power supply](#)
- [Hard drive carrier](#)



## Tools

No tools are required for this procedure.

## Steps For Removal

**Important:** Write the system serial number on the inside of the bottom cover when installing a replacement housing.

## Steps For Reassembly



1. Replace the [hard drive carrier](#).
2. Replace the [power supply](#).
3. Replace the [logic board](#).
4. Replace the [fan](#).
5. Replace the [antenna plate](#).
6. Replace the [bottom cover](#).

# Apple USB SuperDrive

## First Steps

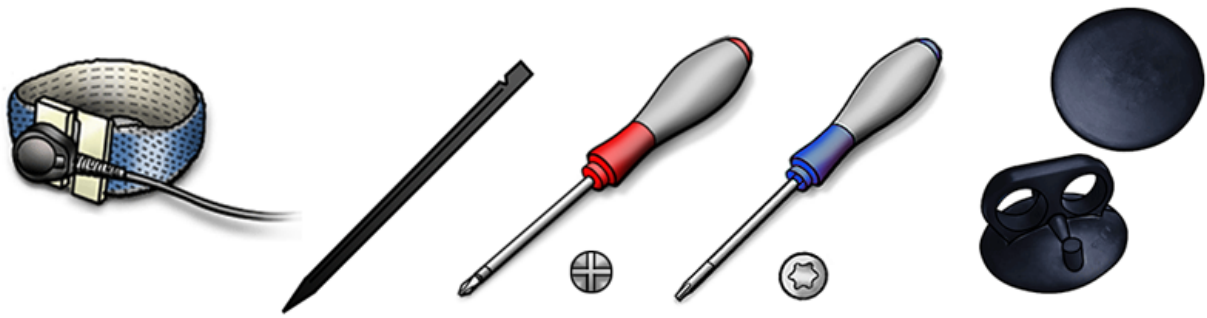
**Important:** The following procedure is intended only for removing a stuck disc from an Apple USB SuperDrive at the user's request. Do not take apart an Apple USB SuperDrive for repair. The repair strategy for this product is Whole Unit Replacement.

This procedure requires placing SuperDrive upside down on its top case. Always use a clean, debris-free static mat to avoid scratches and other cosmetic damage to the housing.



## Tools

- ESD wrist strap and mat
- Black stick (922-5065)
- #000 Phillips screwdriver
- T10 Torx screwdriver (later models)
- Suction cup (922-8252)



## Steps For Removal

Because this is a handheld procedure, perform these steps over a workbench or elevated repair surface to minimize height from which a component might fall.

1. Hold SuperDrive securely in one hand by edges of silver top case, with black bottom case facing up and USB cable leading away from you.



2. With other hand, place suction cup on center of bottom case. Press down firmly to flatten and secure suction cup.



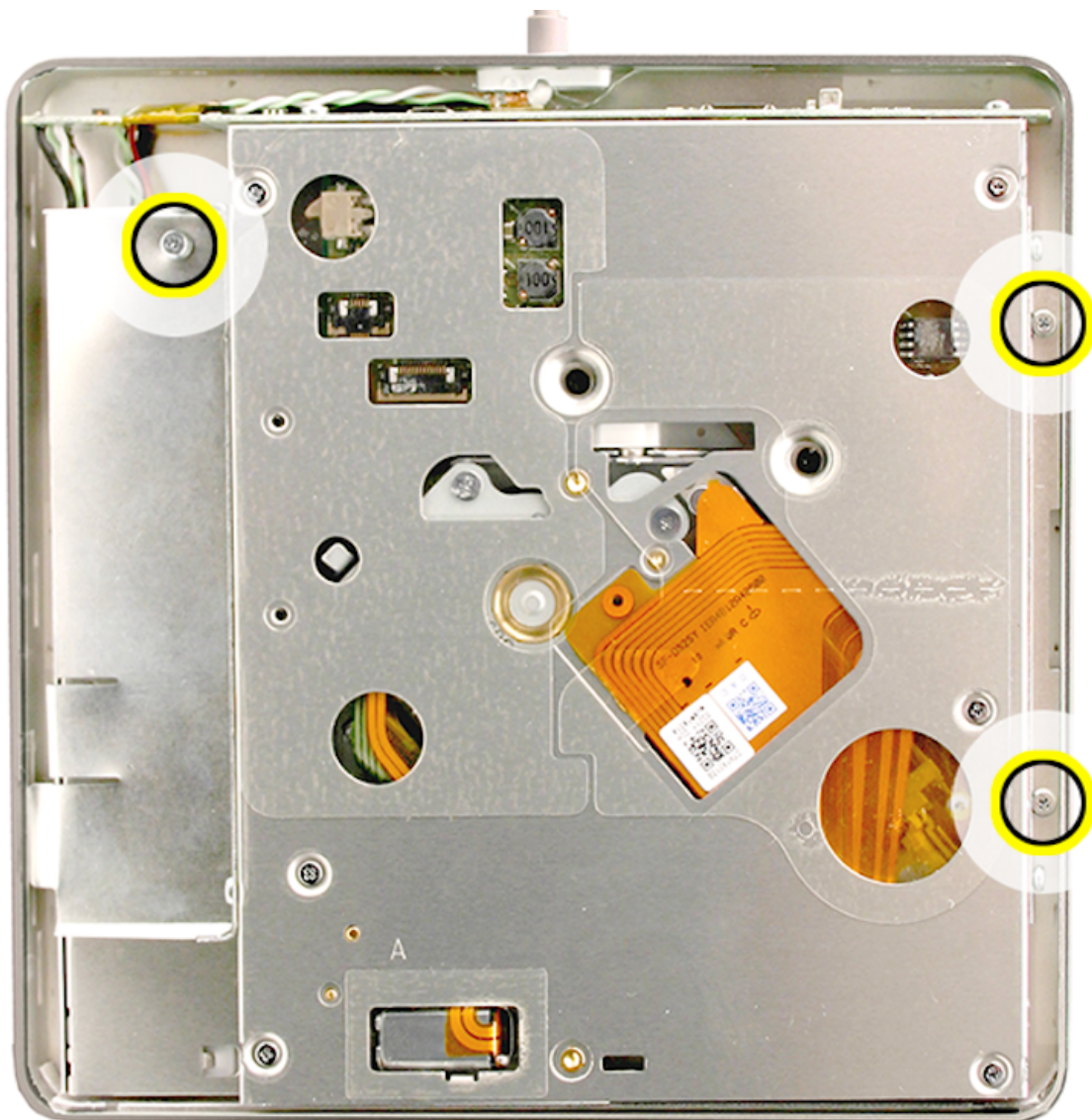


3. Once suction cup is fully adhered, lift straight up. Pull bottom case directly out of top case in one smooth motion. Secure fit might give a lot of resistance.

**Important:** Adhesion of suction cup is short-lived. To avoid damage from dropping, immediately set bottom case on a clean surface. Be mindful of tabs.

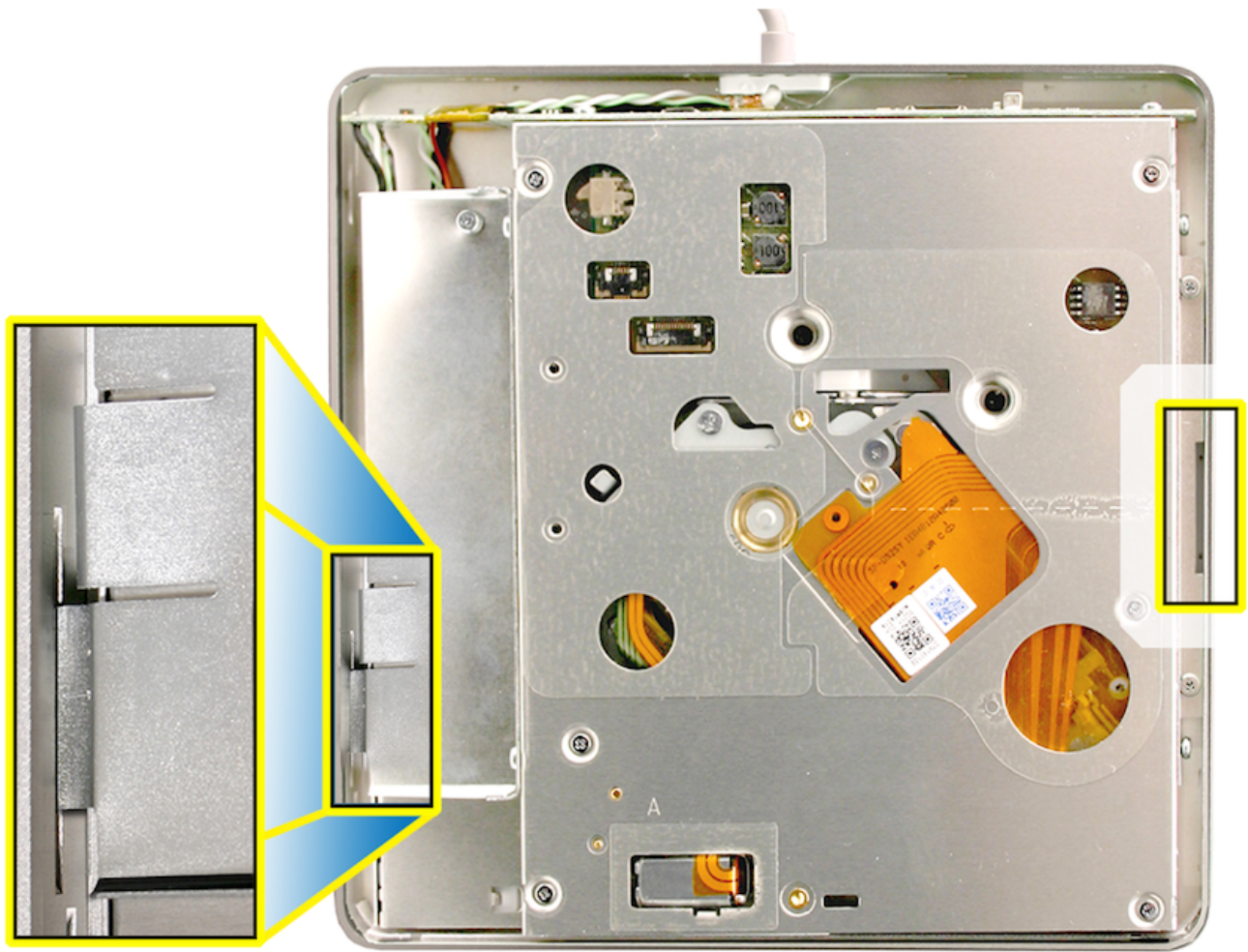


4. Set drive top-down on a soft, clean surface, with inside facing up and USB cable leading away from you. Remove three #000 Phillips screws (shown below).



5. Note tab on lower left of drive fits into recessed slit on inside edge of top case (see below left). On opposite side of drive, note gap in center of right edge of drive (see below right).





6. Insert flat edge of black stick into gap on right edge of drive. Carefully pivot edge upward slightly, just enough to slide drive a few millimeters right. Ease left tab out of top case.



7. Note internal cable leading to external USB cable. In earlier model you will see a controller board connected to cable (see inset below).

**Caution:** Since cable remains connected during this procedure, be careful not to pull or stress cable connections. To avoid

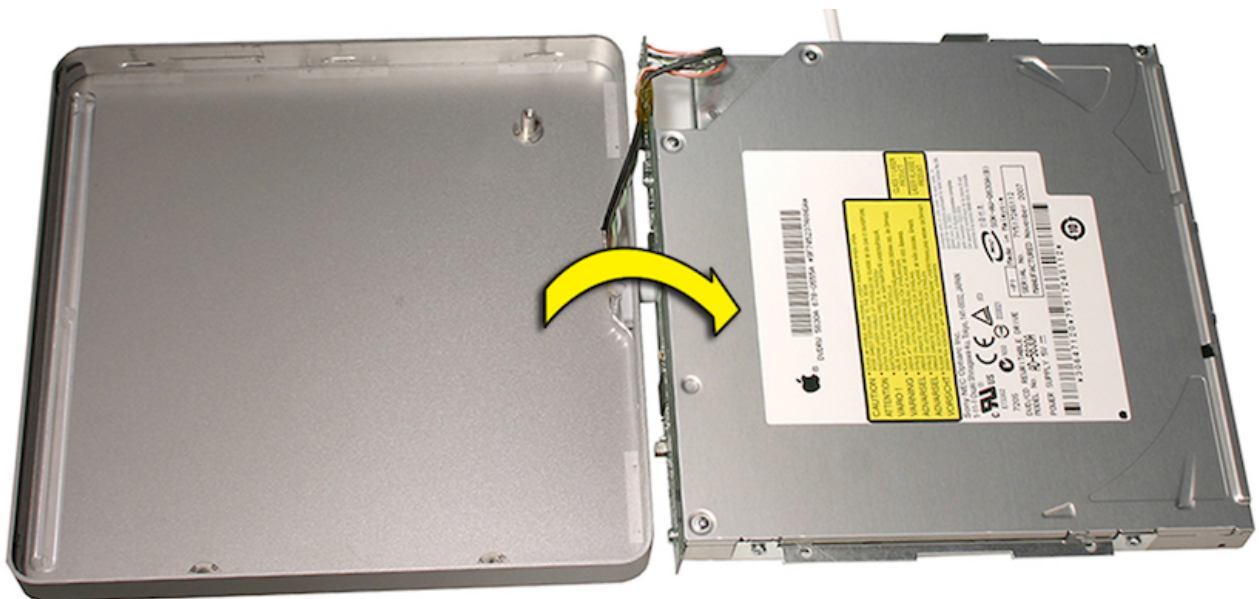


damaging cable, always keep drive within an inch or so of outer case.

8. Grip drive by edges. Avoid touching components. Lift drive up and out of top case a few millimeters — enough to pivot and flip drive over.



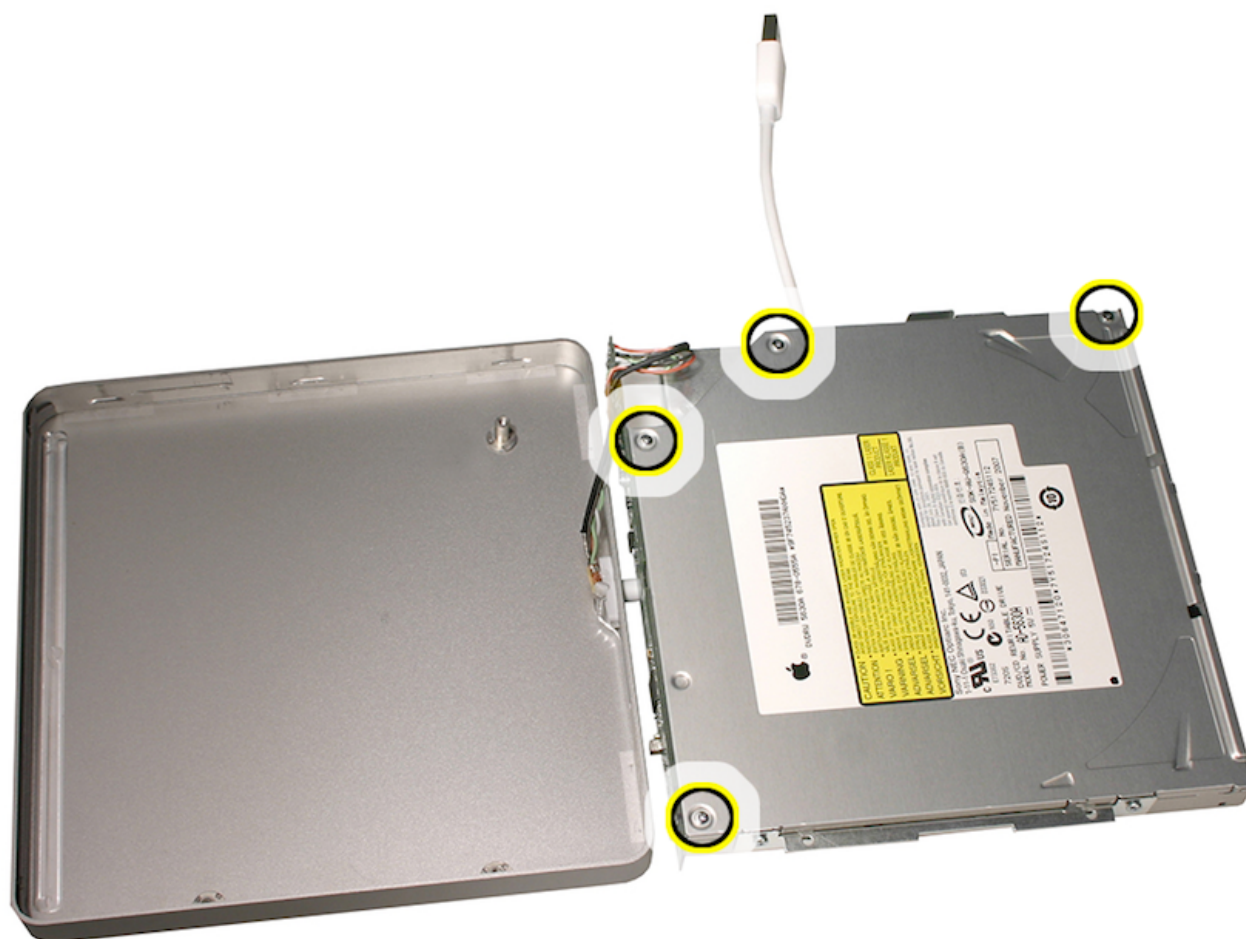
9. As if opening a book, flip drive up and over. Gently lay it down, keeping edges as close together as possible to avoid straining cable connections.



10. Immobilize drive while removing screws or components, holding drive by bracket or edges only.



11. Remove four #000 Phillips screws from top of drive (shown below).



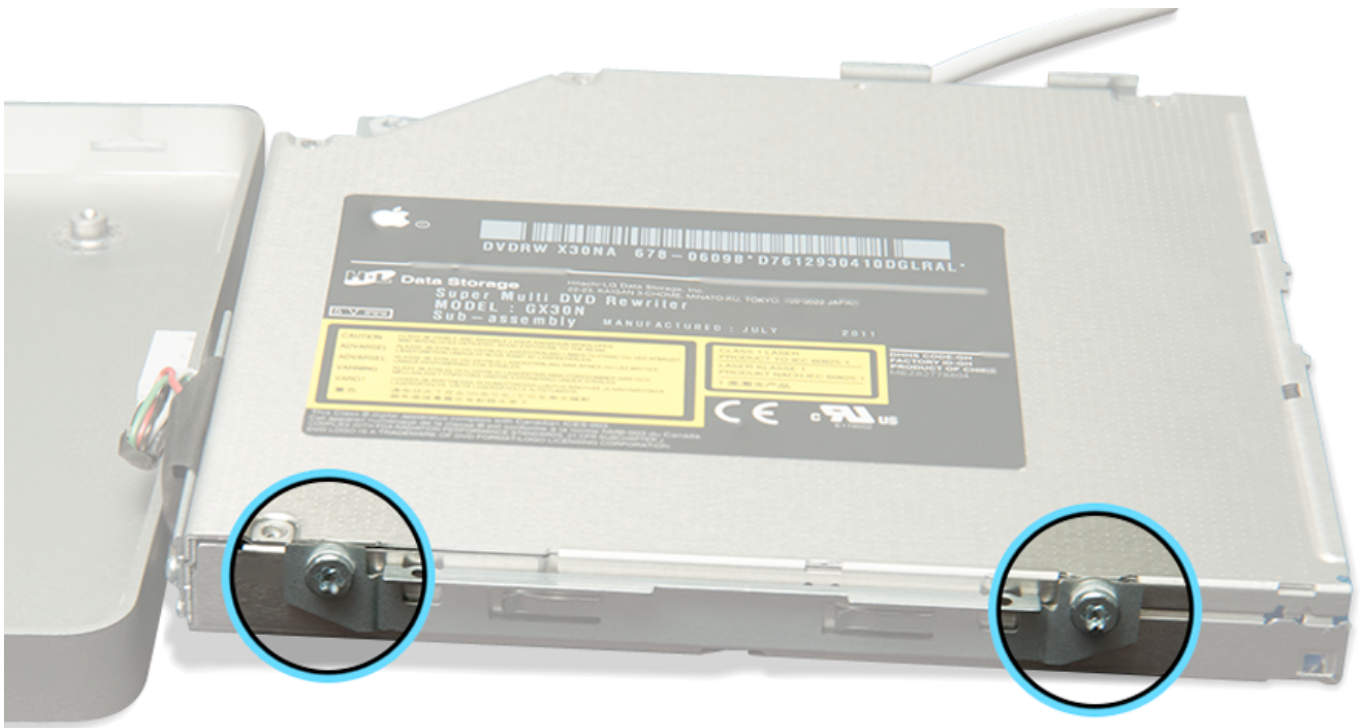
12. Remove two T10 screws or two Phillips screws (depending on model) holding bracket to drive.

**Earlier model:**





Later models:



13. Lift top lid of drive, pivoting right edge up. Then shift lid left and downward to remove left edge.





14. Remove stuck disc. Reassemble SuperDrive in reverse order of previous steps 4-13. Proceed to step 15 to correctly reinstall bottom case.



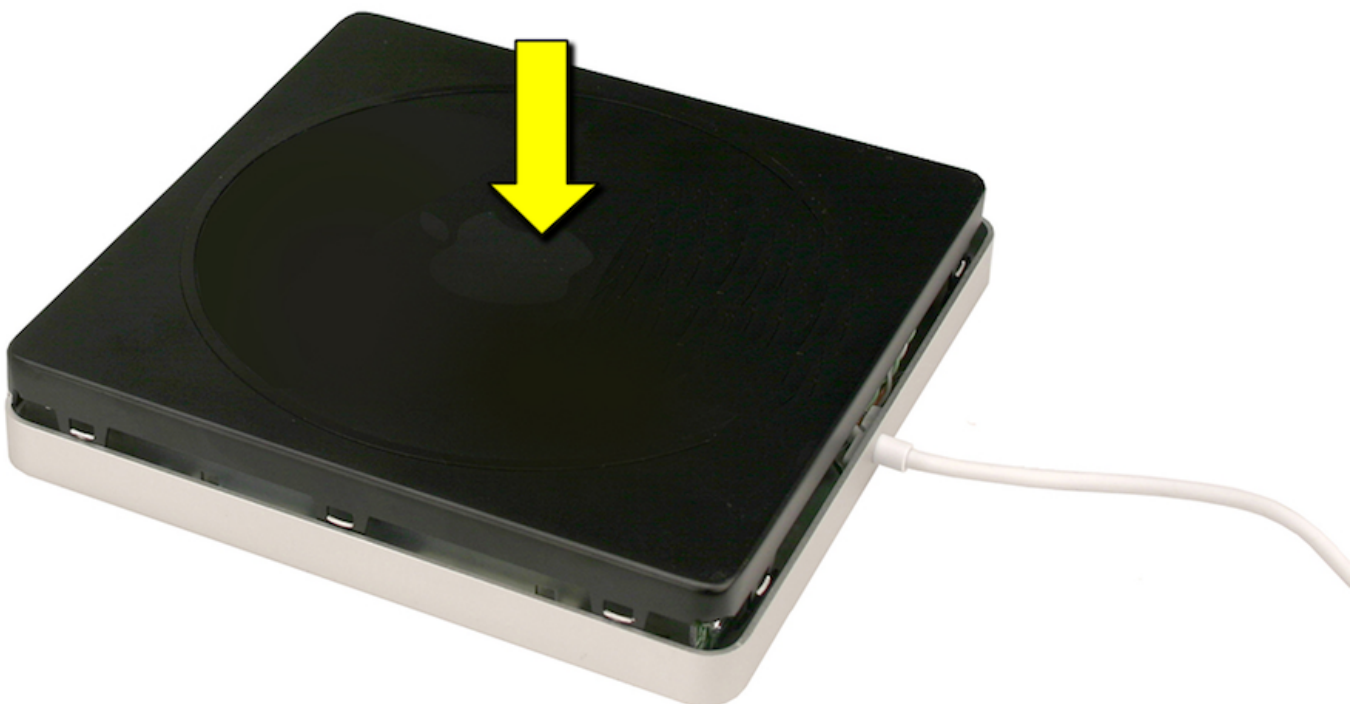
15. Orient bottom case to top case, as pictured below. Note three tabs per side on left and right sides of drive and two corner tabs in back. There are no tabs in front (where disc slot is located).



16. Set bottom case evenly on top case with tabs just inside perimeter of top case edge. Align all tabs with top case.

**Note:** If case is oriented correctly, Apple logo will be right-side up when USB cable is pointed toward you.

17. With firm, even pressure, snap bottom case into top case to seat tabs. Verify all tabs are fully seated and SuperDrive sits flat.



**Steps For Reassembly**

Reassemble in reverse order of removal steps.

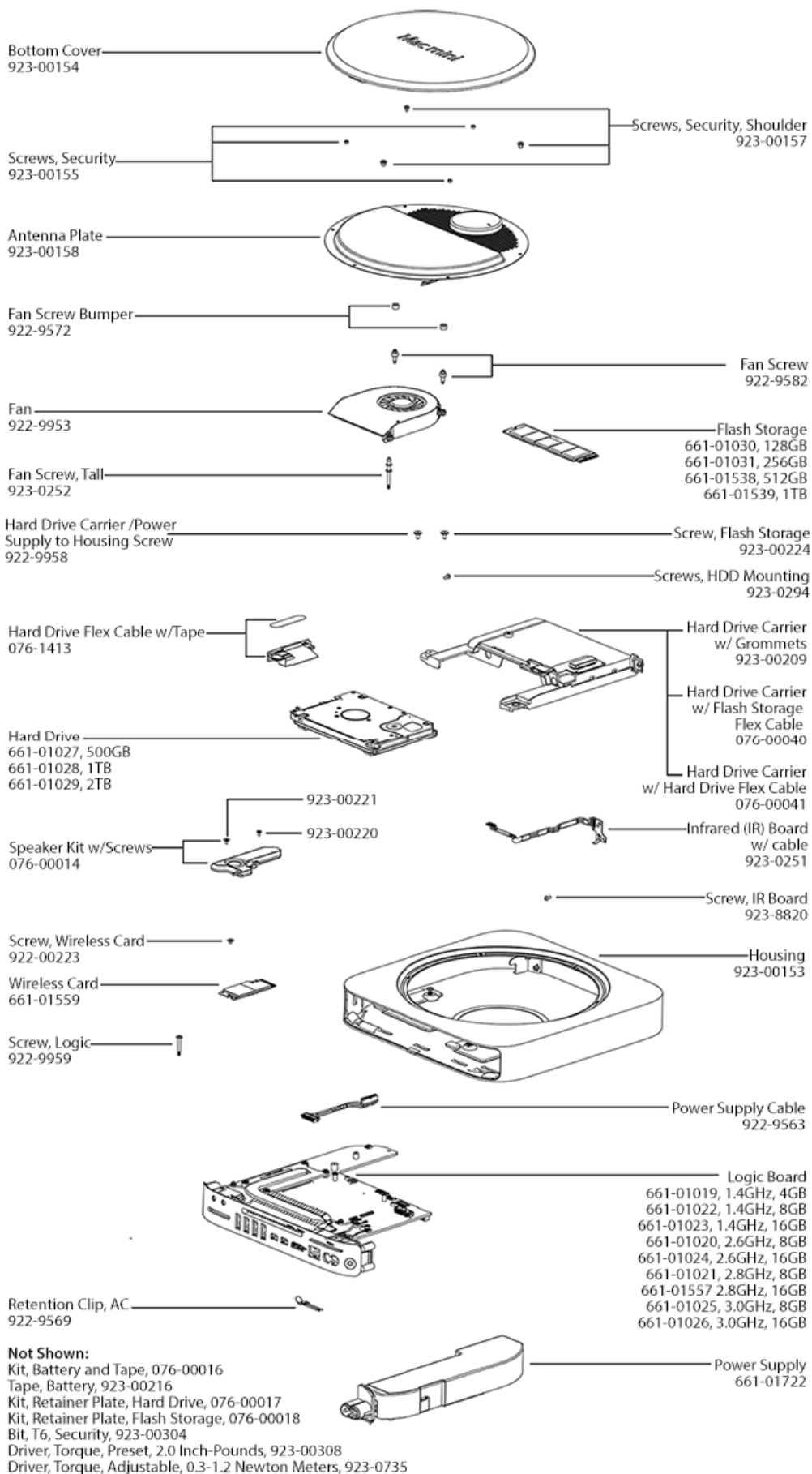
### **Quick Test**

Plug Apple USB SuperDrive into known-good computer to check functionality. Check drive for disc insertion, mounting, and ejection of a variety of optical media.



# Exploded View










## Mac mini (Late 2014): Exploded View










**Note:** Effective immediately, some coin cell batteries used on Mac systems are now available only from electronics parts distributors (for example, MCM). The coin battery is no longer available to order via GSX. When the Mac repair process indicates the coin battery needs to be replaced, please order it from an electronics parts distributor. **Note:** BR2032 and CR2032 batteries have the same form factor and nominal voltage. However, BR2032 batteries have a lower self-discharge rate and broader operating temperature range than CR2032 batteries for longer shelf and service life.

# Screw Chart

**Note:** Screws are not to scale.

<p><b>922-9572</b> Bumper</p>  <p>- Top of fan screws (2)</p>	<p><b>922-9582</b> Torx T6</p>  <p>- Fan logic board (2)</p>	<p><b>923-0252</b> Torx T6</p> <p><b>Note:</b> Screw must be tightened to a torque value of 2.0 in-lbs. Use preset torque driver 923-00308.</p>  <p>- Standoff, fan, tall (1)</p>
<p><b>923-00224</b> Torx T5</p>  <p>- Flash storage (1)</p>	<p><b>923-00157</b> Torx T6 tamper proof screw</p> <p><b>Note:</b> Screw must be tightened to a torque value of 2.5 in-lbs. Use torque driver 923-0735 on its lowest setting.</p>  <p>- Antenna plate to housing (3)</p>	<p><b>923-00155</b> Torx T6 tamper proof screw</p> <p><b>Note:</b> Screw must be tightened to a torque value of 2.5 in-lbs. Use torque driver 923-0735 on its lowest setting.</p>  <p>- Antenna plate to housing (3)</p>
<p><b>922-9958</b> Torx T6</p>  <p>- Hard drive carrier to housing (1) - Power supply to housing (1)</p>	<p><b>922-9585</b> Torx T8</p>  <p>- Hard drive carrier (4)</p>	<p><b>922-9959</b> Torx T6</p> <p><b>Note:</b> Screw must be tightened to a torque value of 2.0 in-lbs. Use preset torque driver 923-00308.</p>  <p>- Logic board (1)</p>



<p><b>923-00316</b> Torx T6</p>  <p>- Flash storage to retainer screws (2)</p> <p>- HDD (1) retainer screws</p>	<p><b>922-8820</b> #0 Phillips</p>  <p>- Infrared (IR) board (1)</p>	<p><b>923-00220</b> Torx T6</p>  <p>- Speaker (1)</p>
<p><b>923-00223</b> Torx T6</p>  <p>- Wireless card (1)</p>	<p><b>923-00156</b> Torx T6</p>  <p>- Wireless antennas (20156)</p>	<p><b>923-00221</b> Torx T6</p>  <p>- Speaker to logic board standoff (1)</p>
<p><b>922-9569</b> Retention clip</p>  <p>- AC power cord socket (1)</p>		

# External Views

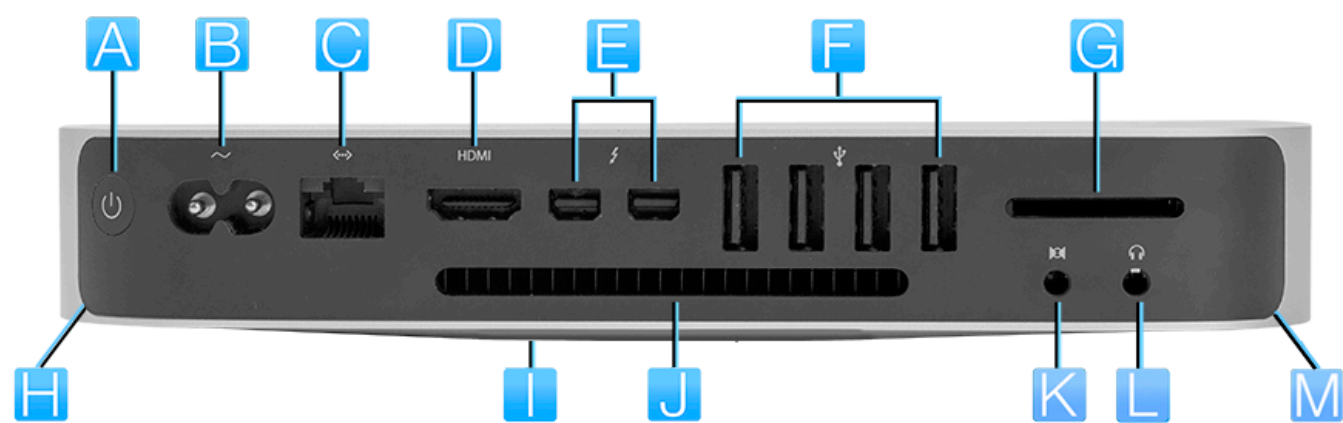
## Front View

A = Housing  
B = Built-in IR (infrared) receiver  
C = Status indicator light



## Port View

A = Power button  
B = Power port  
C = Gigabit Ethernet port (10/100/1000 Base-T)  
D = HDMI (High-Definition Multimedia Interface) port  
E = Thunderbolt ports (2)  
F = USB 3.0 ports (4)  
G = SDXC card slot (Secure Digital Extended Capacity)  
H = Antenna 1, Wi-Fi/Bluetooth shared (located next to the power button, connects to the #1 connector in the middle of the wireless card)  
I = Antenna 0, Wi-Fi (located at the bottom of the housing, attached to antenna plate, connects to #J0 connector on the wireless card)  
J = Exhaust vent  
K = Audio-in port  
L = Audio-out port  
M = Antenna 2, Wi-Fi (located next to the SD card connector, connects to the #2 connector on the left on the wireless card)





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